

# ISR

## INDIVIDUAL SUPPORT and RETENTION



VERMONT MARBLE COMPANY  
PROCTOR, VERMONT 05765

VERMARCO

I-S-R SYSTEM

INDIVIDUAL SUPPORT and RETENTION

MECHANICAL INSTALLATION

of

MARBLE VENEER



Vermont Marble Company  
61 Main Street  
Proctor, Vermont 05765  
(802) 459-3311

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## INTRODUCTION

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## VERMARCO I-S-R ANCHORING METHOD and ERECTION SYSTEMS

### FOREWORD

As presented and detailed in these pages, the I-S-R systems are designed for the installation of Exterior veneer. However only the joint width and joint treatment need be changed to adapt them to Interior work. The I-S-R method is well suited to the setting of marble on high walls in entrance lobbies, in stair halls, and in escalator areas; and for the facing of columns, beams and soffits.

Although detailed herein for the installation of 7/8" veneer, the I-S-R method can be used without modification for 1 1/4" stone and is readily adaptable to material of other thickness, for general wall facing or for feature panels or special items.

Whenever the term "marble" is used throughout the following text, it should be interpreted to include granite, serpentine or other natural stone veneer, since the I-S-R method is suitable for all.

## INTRODUCTION

The Vermarco I-S-R method of installing thin marble or stone veneer employs stainless steel fittings of simple design to provide both support and retention for each individual piece of marble and to maintain its alignment with the adjoining pieces. Compressed-foam joint filler and elastic joint sealant also are designed parts of the I-S-R method. The resulting veneer installation can absorb movement due to vibration, variable wind pressure and changes in temperature, and remain weather-tight.

Marble veneer installation by this method is completely mechanical. Leading edges of the I-S-R retention angle engage with grooves in the edges of the marble slabs. No mortar is used, and there are no rigid spacers in the joints. In effect all joints, both horizontal and vertical, are expansion joints. With the individual support on resilient tape and the soft joints, there is no linear accumulation of dimension increases due to expansion. All joints then can be of uniform width, with no wide expansion joints unless the building itself is segmented to provide for expected movement.

The I-S-R method is designed for mounting marble veneer on a structural grid previously installed on the building, or for direct application of the veneer to the building surface. Also by this method it is possible, with economy, to combine grid mounting and surface application in situations where neither system alone can best satisfy the requirements of the architectural design.

### The I-S-R Grid Mounting System

involves the pre-erection and alignment of a system of structural channel struts attached to the building, to which the marble is secured by the I-S-R method. The principal advantage in using the grid lies in its capability of being designed to cover open spaces from floor to floor or from column to column without a masonry back-up wall. In building renovation the grid is particularly useful for masking the existing facade, covering old window openings and wall projections in the creation of a modern design. When 7/8" marble is used with standard grid components, the minimum distance from face of marble to rough-wall line is 3-3/8 inches.

### The I-S-R Surface Mounting System

requires a masonry back-up wall, or a continuous structural building surface, with anchorages provided to which the marble is secured by the same I-S-R method. This direct application often can be done at lower cost, and has the advantage of requiring less setting space. When 7/8" marble is used the minimum distance from face of marble to rough-wall surface is 1-3/4 inches.

### Combined Grid and Surface Mounting

is made possible by the versatility of the I-S-R method. By its use, for example, marble veneer may be surface-mounted on columns and spandrel beams and grid-mounted on a system of struts recessed within the space between columns and between floor-slabs, thereby gaining the advantages of both types of mounting. Standard I-S-R fittings and installation procedures would be used throughout.

For maximum strength and greater economy of space, leading to minimum width of joint, the prime support-and-retention fittings are made from stainless steel plate. All other metal components associated with the stainless steel in the I-S-R installation have been chosen to make negligible any possibility of electrolytic action. Joint fillers designed as strong elastic closed-cell foams, and joint sealants compounded for extension and recovery with high adhesive and cohesive strengths, have been selected for complete compatibility.

Details of the I-S-R component parts and their installation for either grid mounting or surface mounting are presented in the pages following. The successful performance of the I-S-R methods depends entirely on the use of proper component parts and their proper installation. Since V.M.Co. has no control over how someone else may utilize such parts and their installation, V.M.Co. can guarantee only its own installation and assumes no responsibility whatsoever to anyone for the use of the component parts and/or I-S-R installation methods by anyone else. For further information concerning the I-S-R systems or their application to specific problems of construction, contact the Vermont Marble Company, Proctor, Vermont.

# INSTALLATION of MARBLE using the GRID MOUNTING METHOD



Struts are plumbed, shimmed and secured at each vertical joint before special spring nut is inserted.



Bolt is inserted into hole in ISR Starting Angle, then attached loosely to strut.



Angles are leveled to insure proper joint alignment, then the bolts tightened securely.



Resilient tape is applied to bearing surfaces of angle to allow room for expansion and to prevent build-up of pressure between panels.



Marble is fitted into place with lugs in angles engaging slots in edge of marble. Intermediate angles are used in horizontal joints between marble panels.



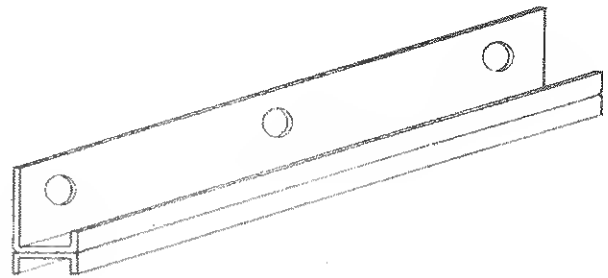
Filler strip is inserted into back half of all joints as marble is set. Final pointing is done with elastic sealant after marble is complete.



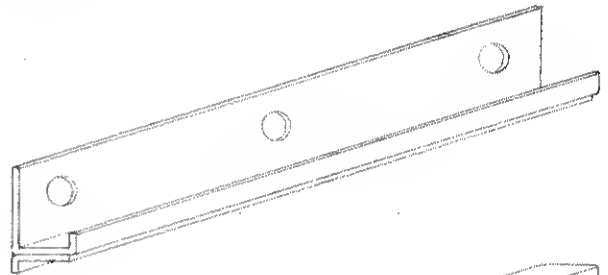
## STANDARD COMPONENTS

Basic elements of the I-S-R method of marble veneer installation are the stainless steel Retention Angles.

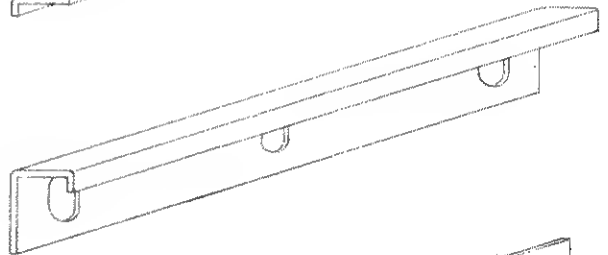
The primary angle is that designed for use at intermediate horizontal joints in wall veneer, or in the facing of pilasters or columns.



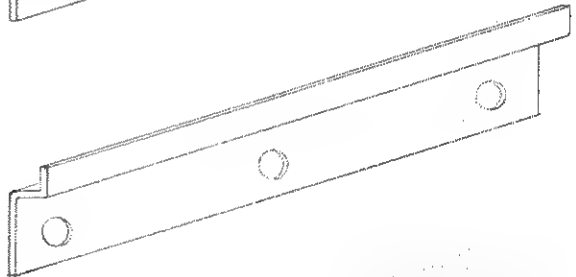
A modification of the angle is used at the bottom of a marble area, at grade or above a low roof or canopy.



One member of the above compound angle, with holes elongated, is used for retention at the top of a marble area.

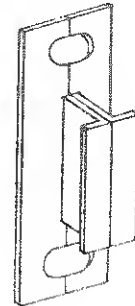


A simplified form is used to engage a retaining liner on back of the slab where the edge of the marble is fully exposed.

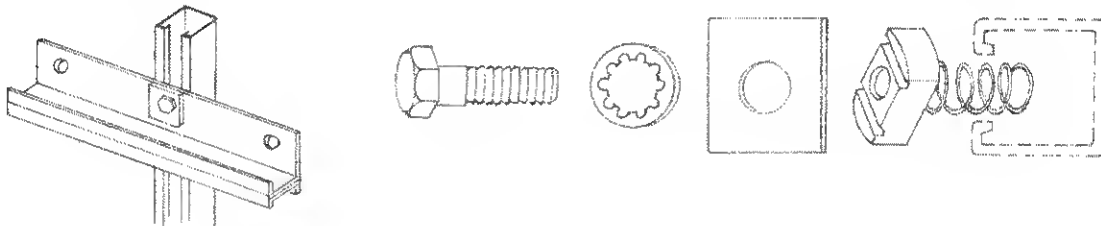


All angles are available in half-length for use at external or internal corners, and in quarter-length for use in situations where space is limited.

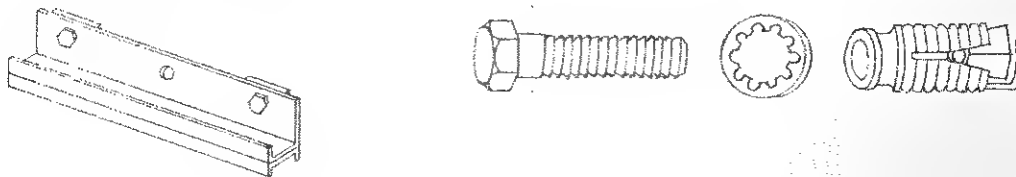
A fitting of similar design is used in the vertical joints of wall veneer where height of slab requires side retention; also in intermediate joints of soffits and ceilings.



For attaching the Retention Angle to a channel strut of the mounting grid, or to a channel-insert built into a building wall, one bolt assembly of special type is used.



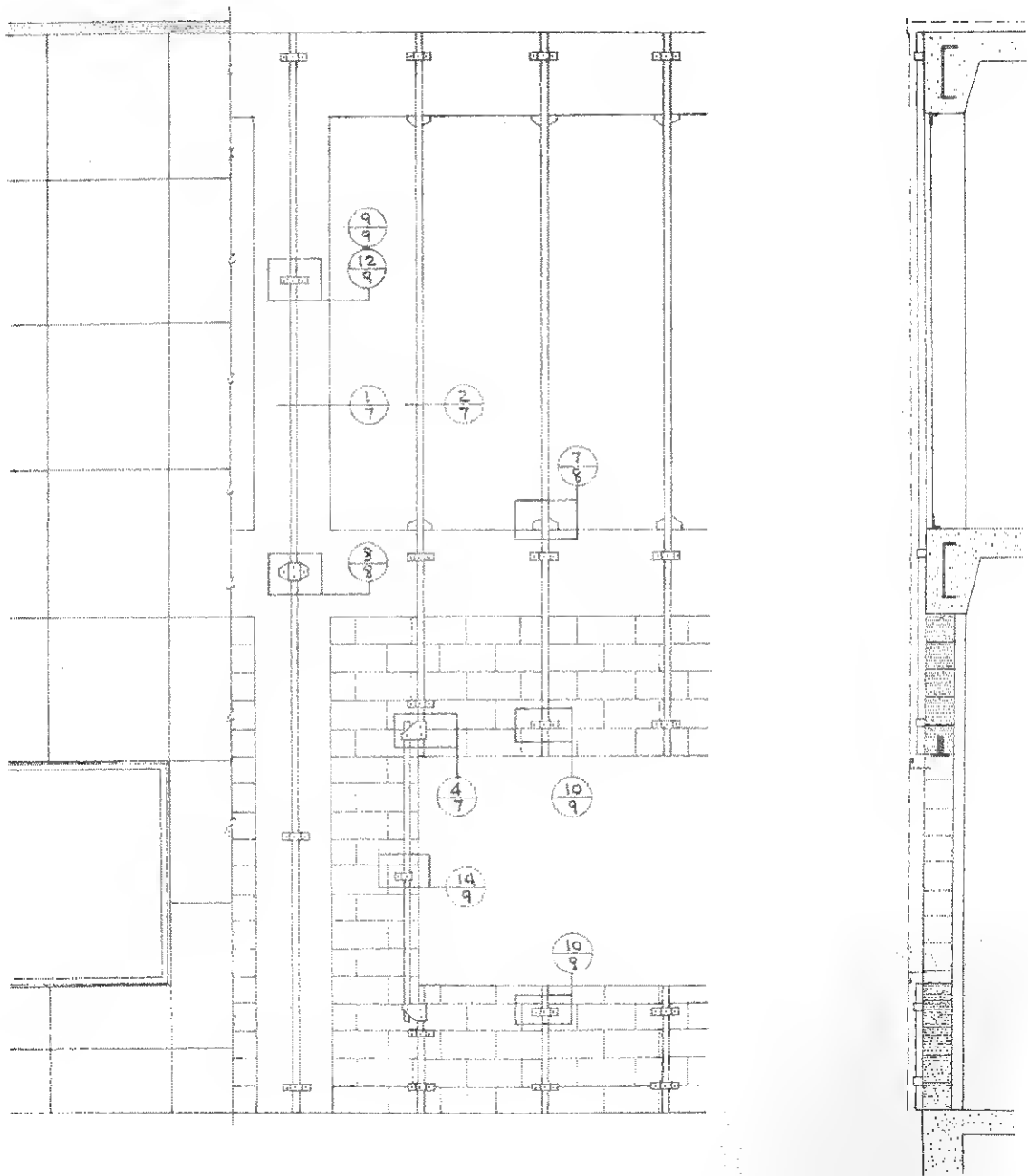
For attaching the Retention Angle to an in-place masonry wall or concrete wall where no anchorage fixtures have been provided, two expansion bolt assemblies are used.



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# MOUNTING GRID

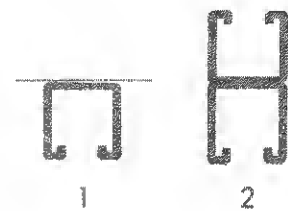


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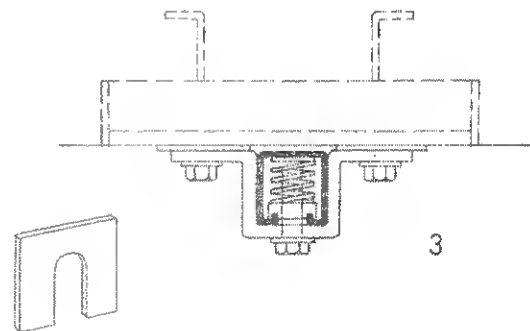
## GRID DESIGN AND COMPONENTS

The marble slabs of a grid-mounted plain veneer area are carried on the vertical channel struts. In general the I-S-R method requires one such strut behind each vertical marble joint, and one at each side of all external and internal corners. Special conditions of slab size and jointing pattern may require a different system of strut spacing or location.

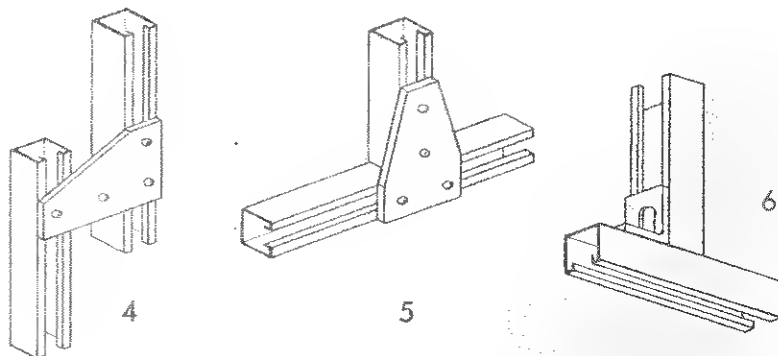
The basic standard member of the grid is the single channel with in-turned edges, rolled from 12-gauge steel. Where the points of anchorage are widely separated, as in the case of vertical channels that span an open space from floor to floor, a double channel (two singles shop-welded back to back) is substituted. Channels are available in standard and special lengths. The latter should be ordered with cut ends coated or painted to prevent rusting or corrosion.



Component fittings include U-straps for attaching the channel struts to previously built-in anchorages; shims for alignment of the channels; and a special bolt having toothed lock washer and spring nut with serrated grooves.



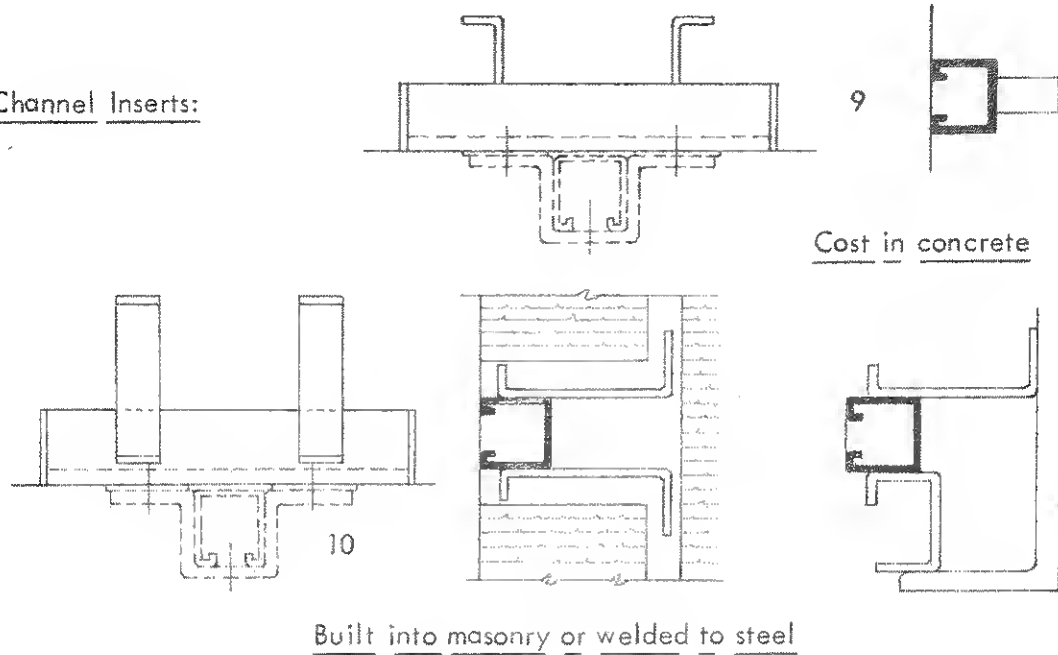
Included also are plates and straps for assembly of the grid members.



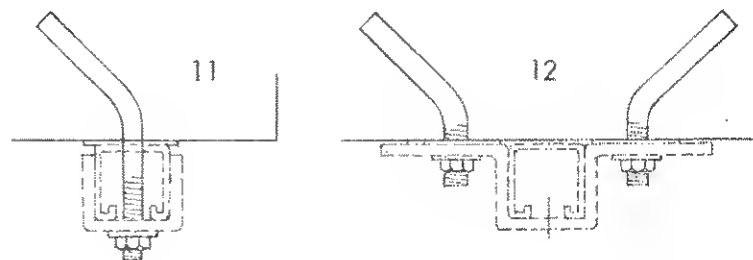
## ANCHORING INSERTS FOR MOUNTING GRID

Attachment of the grid to the building structure is accomplished by bolting to anchorages previously built into the masonry wall, cast in the face of concrete columns and spandrel beams, inserted into existing concrete or masonry, or welded to framing steel.

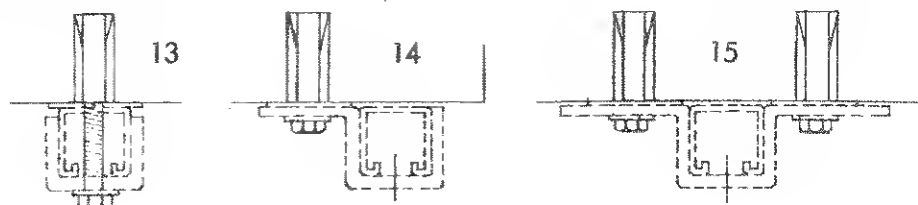
### Channel Inserts:



### Prelocated Anchor Bolts in Concrete:



### Expansion Sleeves in Concrete or Masonry:



## INSTALLATION PROCEDURE FOR GRID MOUNTING

### Preliminary.

Prior to installation of the marble veneer by the I-S-R method, the pre-erected grid should be checked for proper alignment and adjusted where necessary.

### General

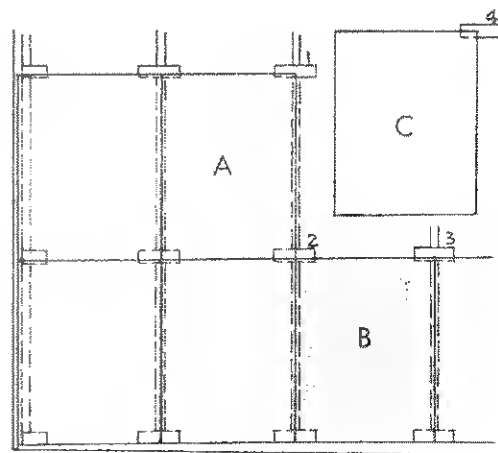
The slabs of marble veneer are slotted in top and bottom edges to receive the leading edges of the I-S-R retention angles.

The retention angles are installed by bolting to the grid channels, using a special bolt having toothed lock washer, plate washer, and spring nut with serrated grooves. Each angle has compression top preopplied to the marble-bearing surface.

Retention angles at the bottom of the starting course are installed to the level indicated on marble erection drawings. Angles installed at the top of each course for its retention will also provide support for the course next above, and are positioned at the proper level to establish the specified width of horizontal joint. A filler strip of foamed plastic, compressed in all joints as the marble slabs are installed, serves as a caulking stop and provides a secondary moisture barrier.

### Installation Procedure for a Typical Marble Veneer Slab.

1. Apply joint-filler strip to edges of pieces A and B where piece C will adjoin, and loosen the retention angle 1.
2. Lower piece C upon angles 2 and 3, and slide the slab toward piece A, gauging the width of vertical joint. Loosely install retention angle 4 for the temporary restraint of piece C. The bed joint above piece B is gauged automatically by previous installation of retention angles 2 and 3.



3. Gauge and tighten retention angle 1 to establish the proper width of horizontal joint between top of pieces A and C and bottom of the next course.
4. Repeat for the next piece.

#### Special Conditions.

Where large slab dimensions occur, design of the mounting grid should provide channels for the installation of additional retention angles at top, bottom, sides or back as required.

Veneer slabs requiring side anchorage but having the vertical edge fully exposed may have retention provided as shown in detail on page 15.

Soffit slabs may be suspended from either transverse or longitudinal channels, as indicated on page 16, using retention angles in edges or ends and in intermediate joints.

Lintels having the bottom edge completely exposed may be installed by one of the several methods illustrated on page 16.

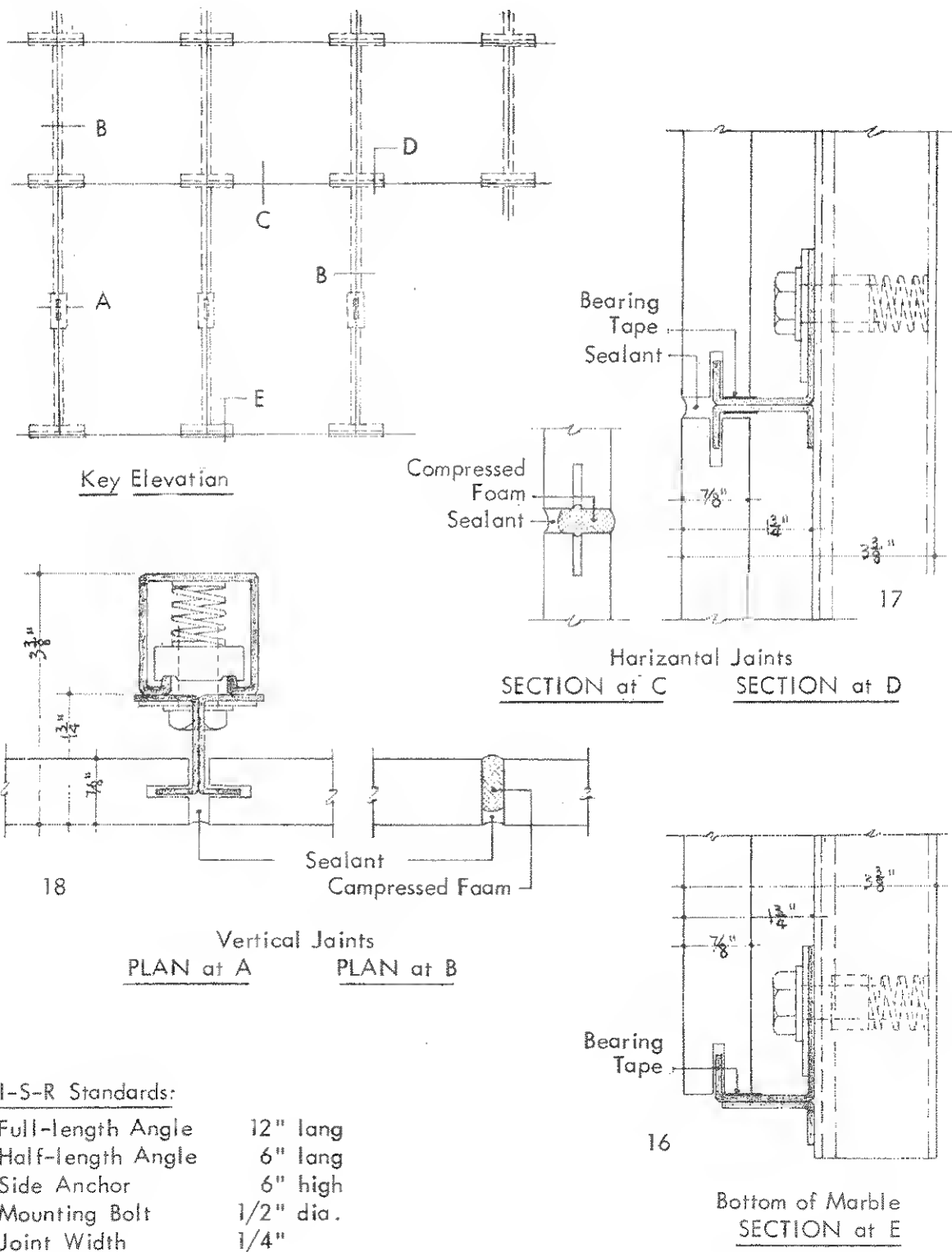
At the top of a marble core, retention angles having the bolt-holes elongated are installed slightly above the marble with bolt snug but not tight and then forced down to engage the groove in the top edge of the marble. Details are on page 16.

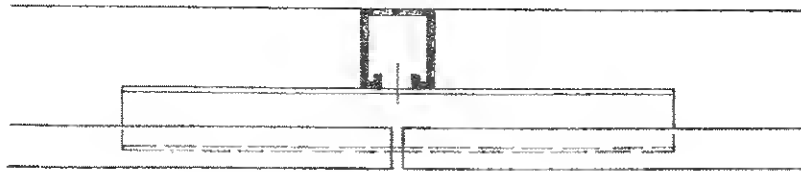
#### Finol.

After the marble is installed all joints are sealed using an approved gun-type elastic sealant, following the manufacturer's instructions explicitly. Marble joints are masked with tape, and primed, when such procedures are required.

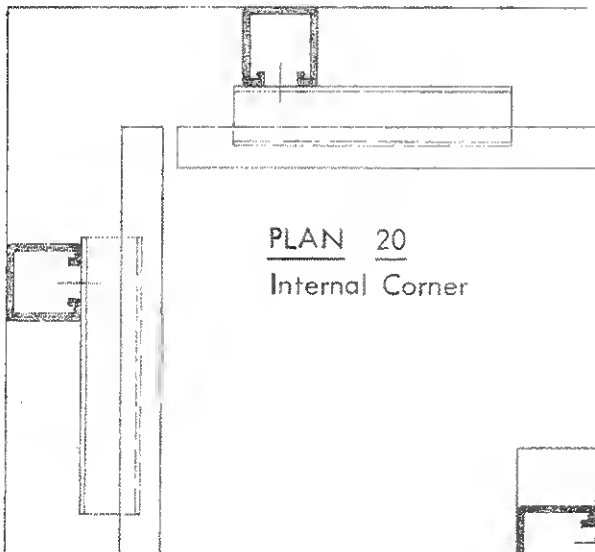


## INSTALLATION DETAILS FOR GRID MOUNTING

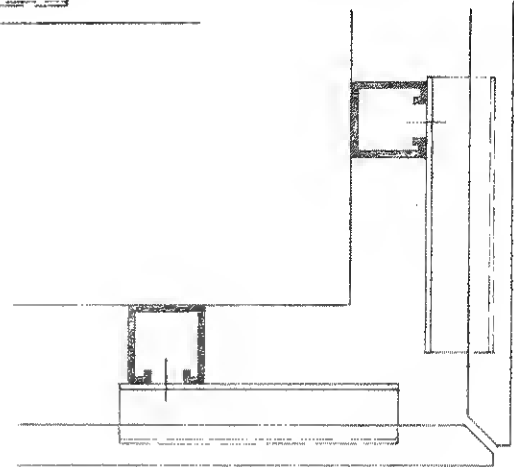




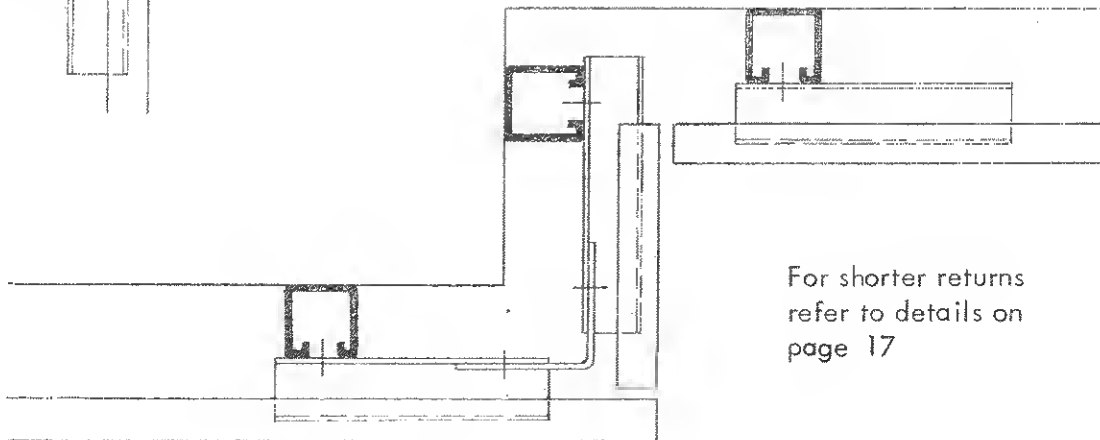
PLAN 19  
Plain Wall Area



PLAN 20  
Internal Corner



PLAN 21  
External Corner

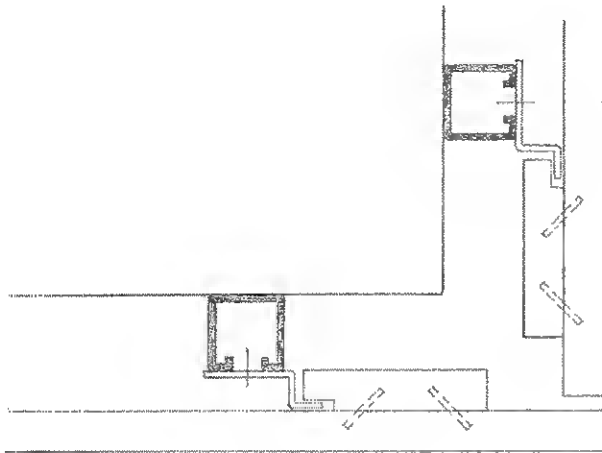
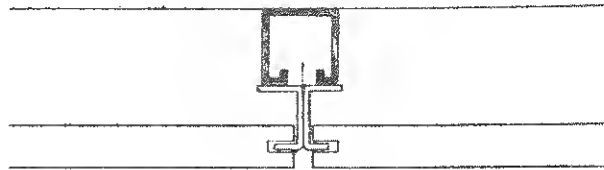


PLAN 22  
Pilaster Return

For shorter returns  
refer to details on  
page 17

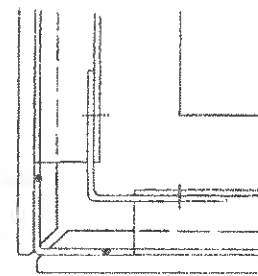
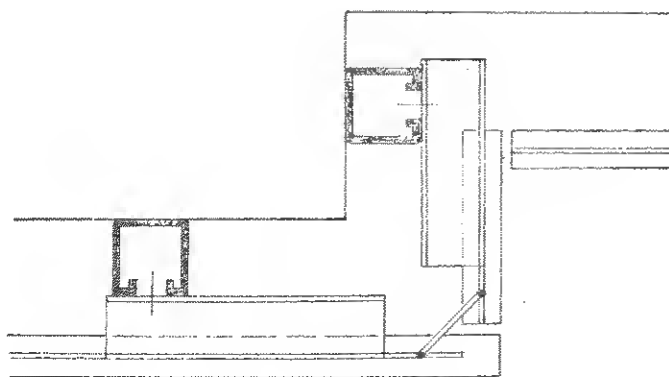
PLAN 23

Supplemental Side  
Retention in Vertical  
Joints of Plain Wall Area



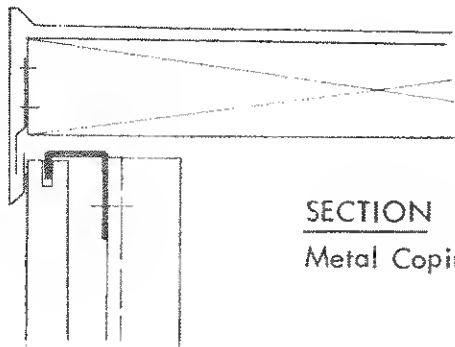
PLAN 24

Supplemental Side  
Retention at Vertical  
Corners

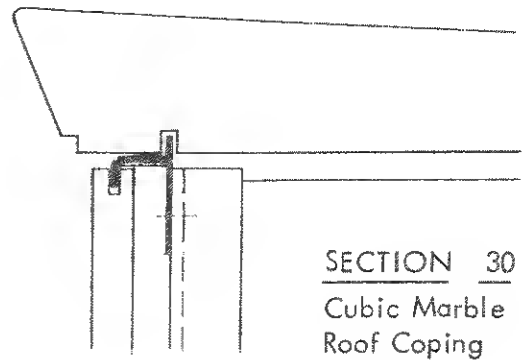


PLAN 25

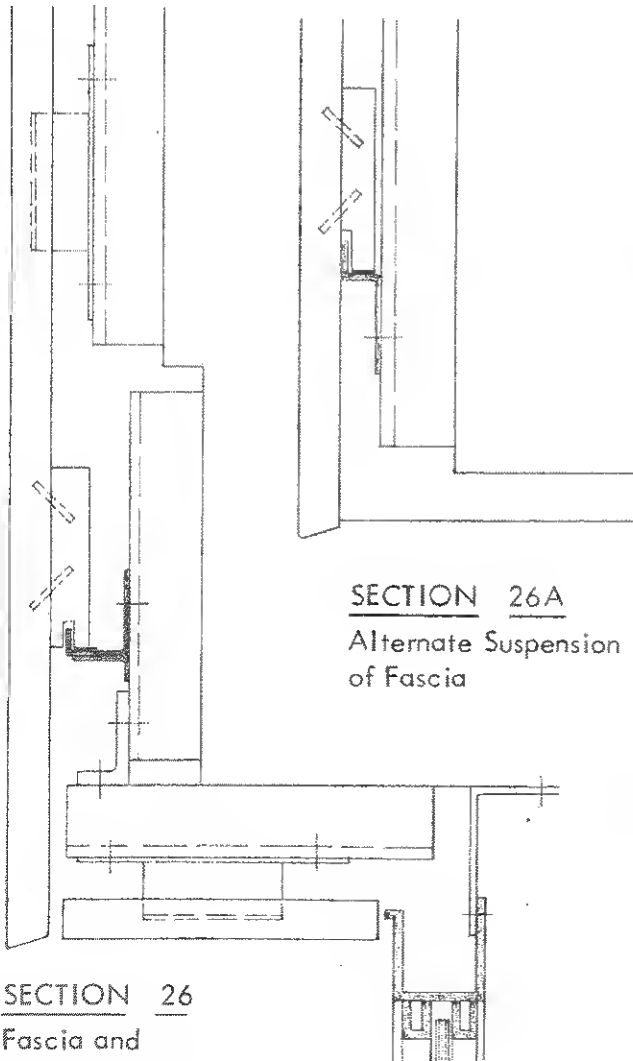
Supplemental Cramp  
Connection of Marble  
Slabs at External Corners



SECTION 29  
Metal Coping

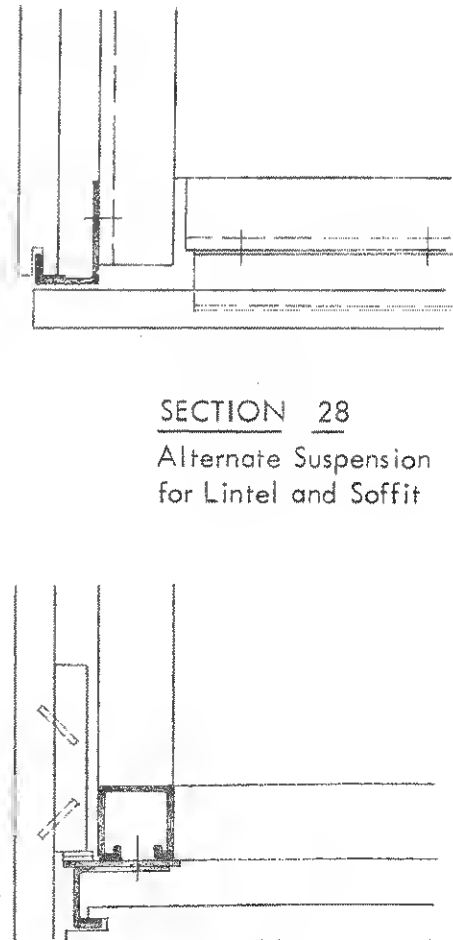


SECTION 30  
Cubic Marble  
Roof Coping



SECTION 26A  
Alternate Suspension  
of Fascia

SECTION 26  
Fascia and  
Soffit Suspension

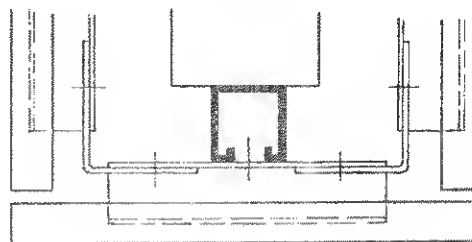
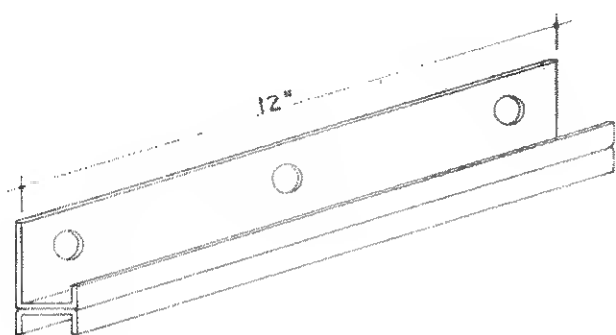


SECTION 28  
Alternate Suspension  
for Lintel and Soffit

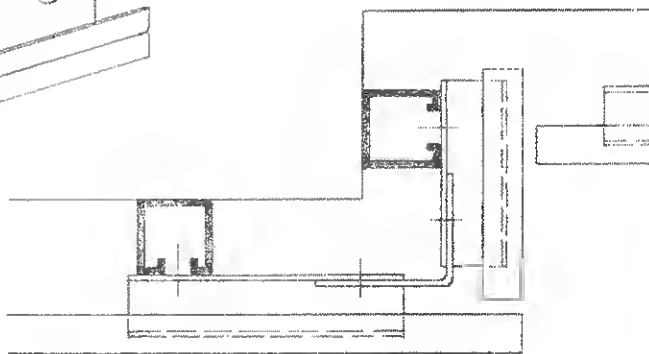
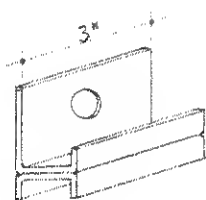
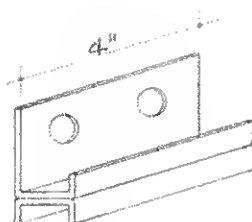
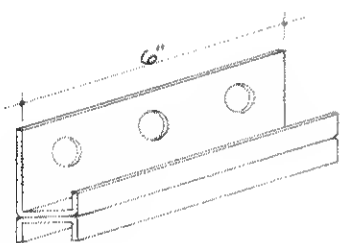
SECTION 27  
Alternate Suspension  
for Lintel and Soffit

## RETENTION ANGLE MODIFICATION

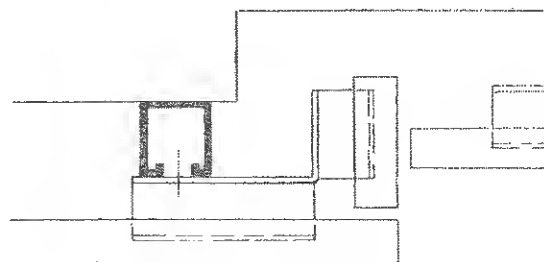
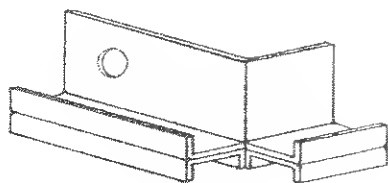
Simple modification of standard retention angles, involving cutting to reduced length or additional bending, provides ready accommodation to any space restrictions.



PLAN 31  
Narrow Pilaster  
or Projecting Wall



PLAN 32  
Short Pilaster Return or Wall Break with or without available space for supporting grid strut

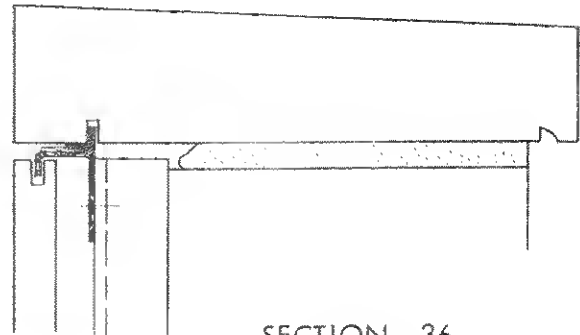


PLAN 33

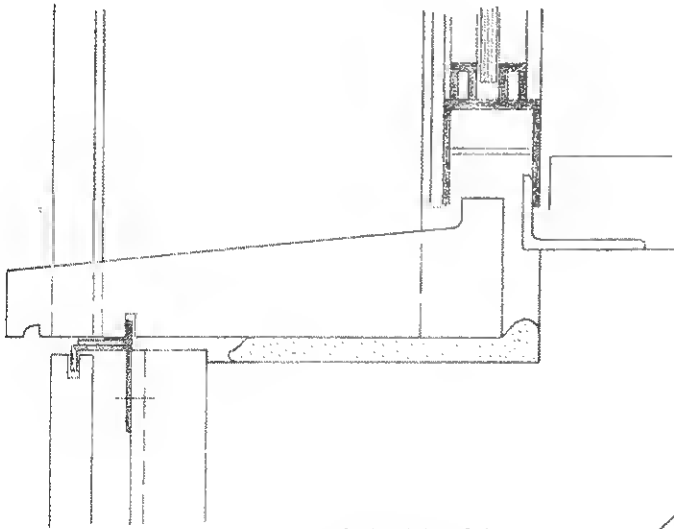
## ADAPTATIONS OF THE I-S-R METHOD

Where items of cubic marble are involved, I-S-R installation may be combined with conventional setting or employed with special support methods.

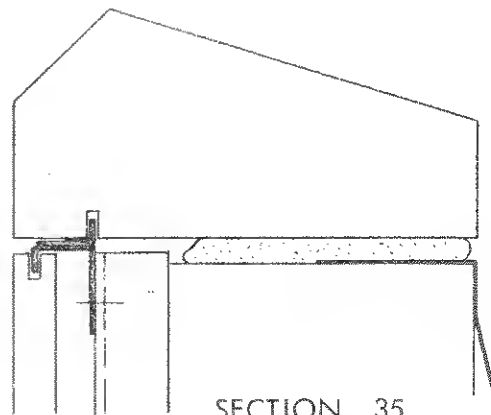
Installation of cubic marble employing the I-S-R method for alignment and retention, and conventional setting methods for support.



SECTION 36  
Cubic Marble  
Roof Coping



SECTION 34  
Cubic Marble  
Slip Sill

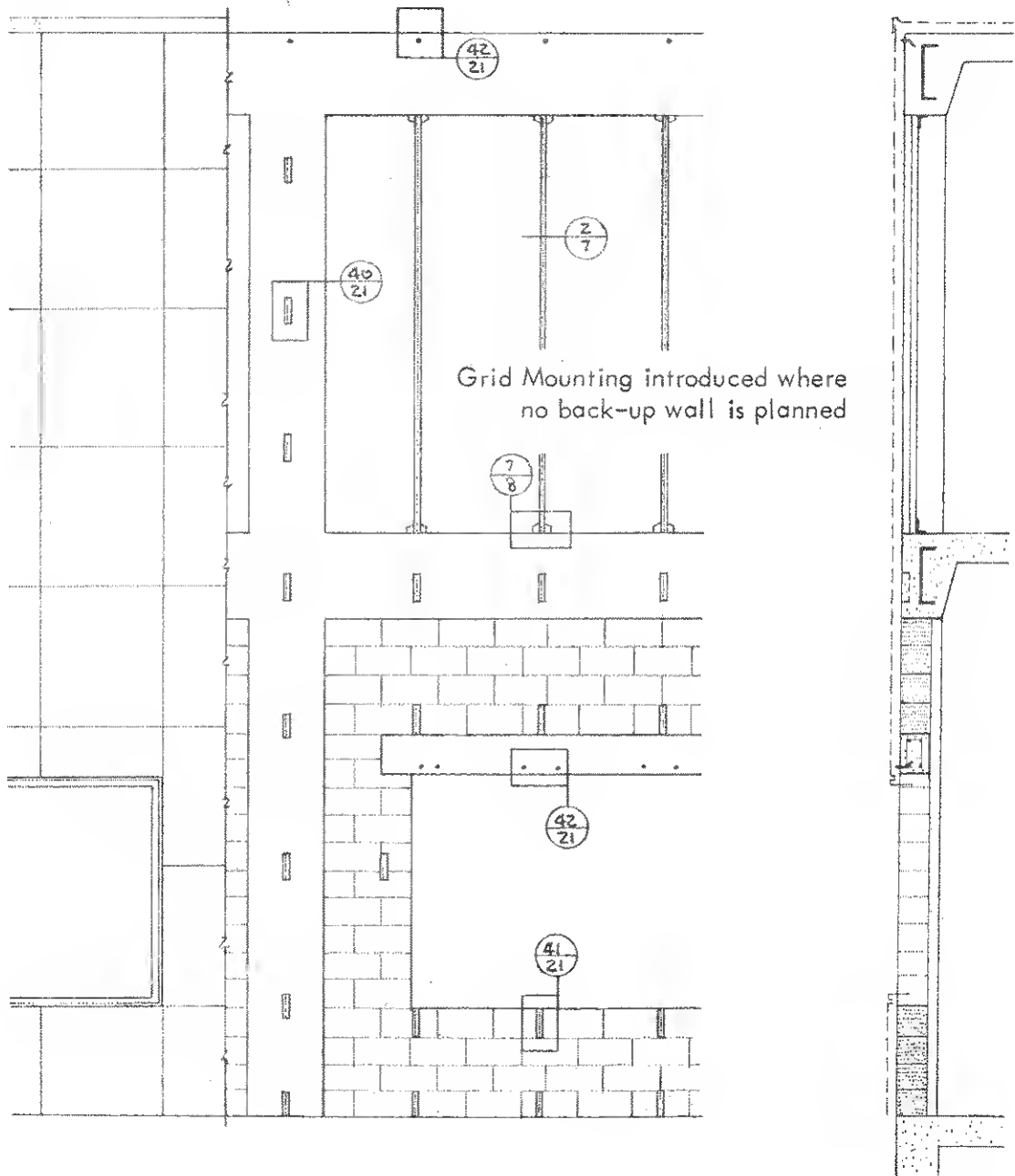



SECTION 35  
Cubic Marble  
Planter Cap

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# SURFACE MOUNTING SYSTEM




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 Page Number

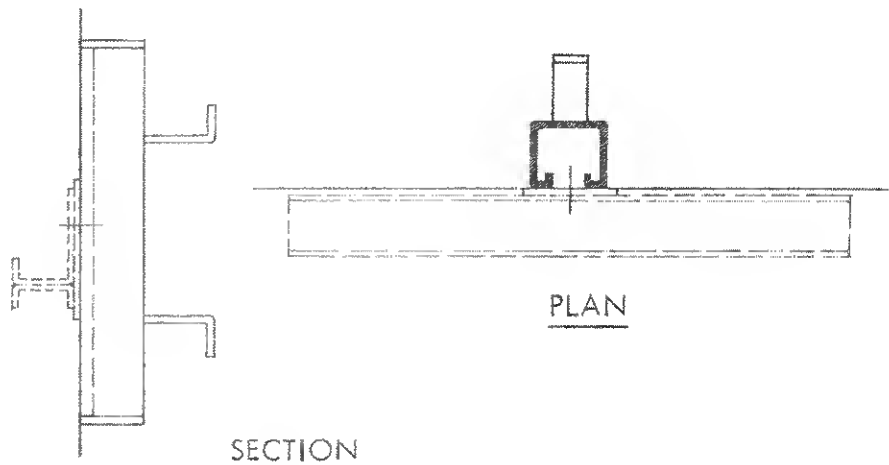


## ANCHORING INSERTS FOR SURFACE MOUNTING

Attachment of the retention angles to the building structure is by bolting directly to anchorage fixtures previously built into the masonry wall, cast in the face of concrete columns and spandrel beams, or welded to framing steel.

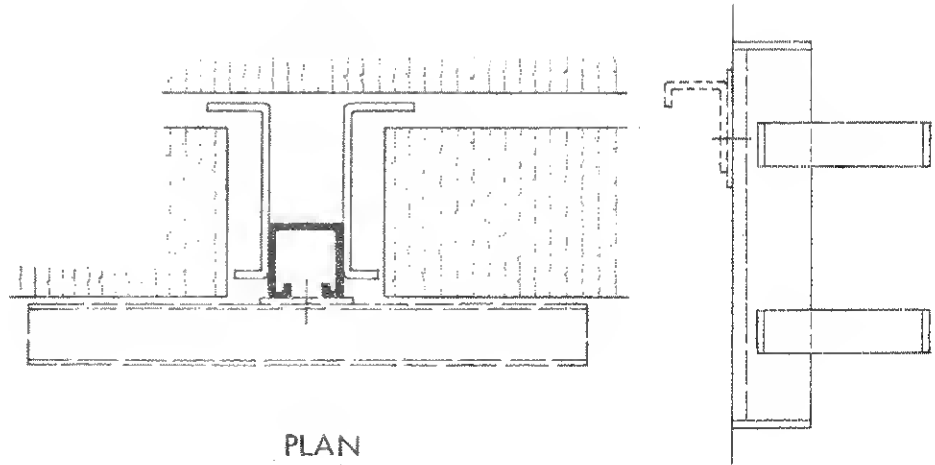
### DETAIL 40

Channel Insert  
Cast in Concrete



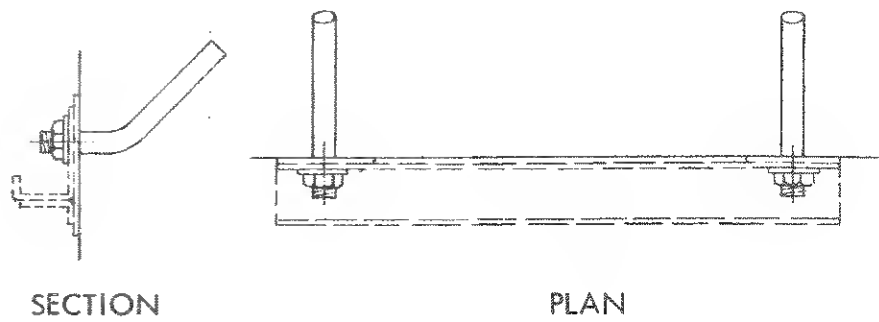
### DETAIL 41

Channel Insert  
Built into Masonry

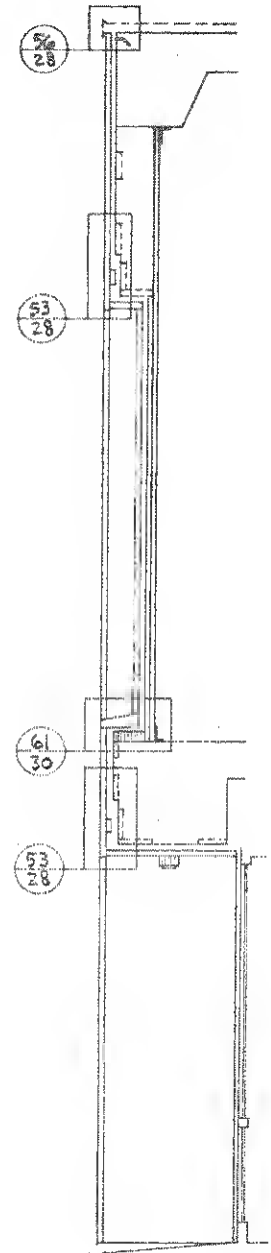
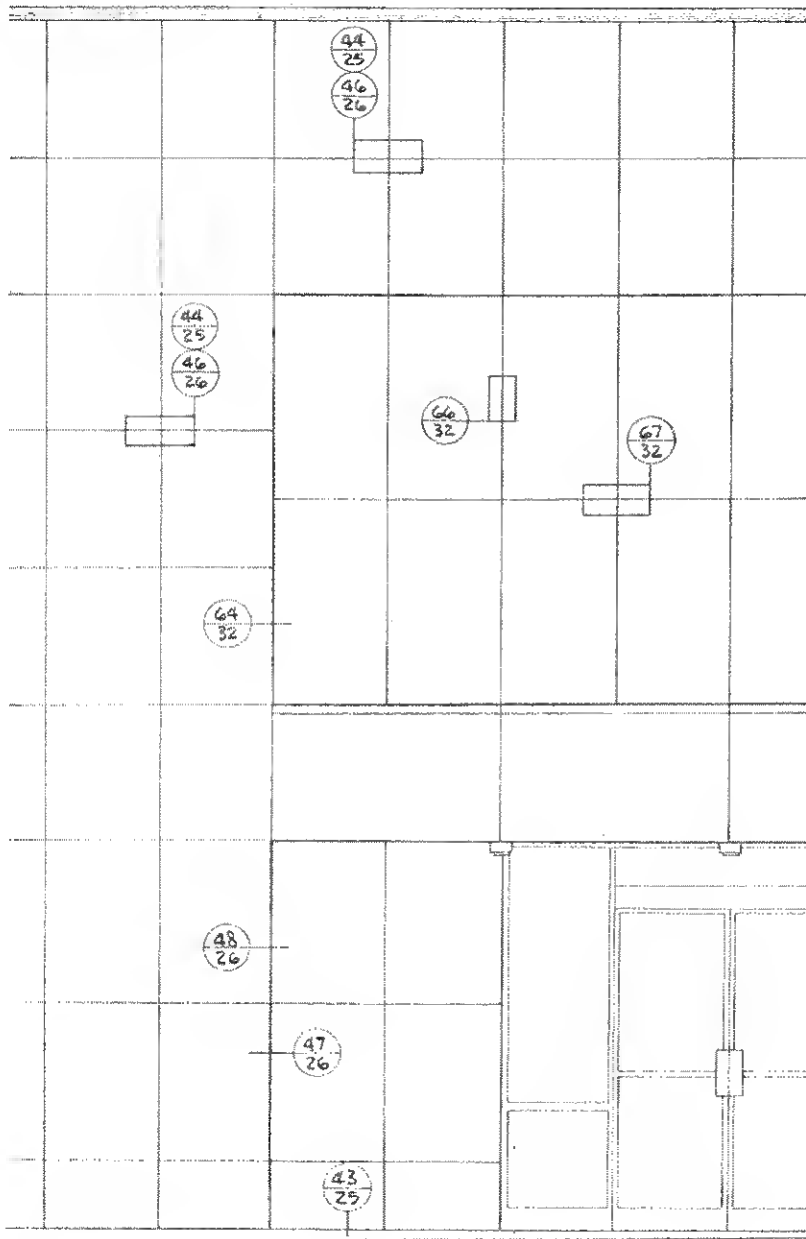


### DETAIL 42

Prelocated Anchor  
Bolts in Concrete



# MARBLE VENEER SURFACE MOUNTED




 Detail Number  
 Page Number

## INSTALLATION PROCEDURE FOR SURFACE MOUNTING

### Preliminary.

Prior to starting the I-S-R installation, the building surfaces to receive the marble veneer should be checked for line and plane. Any condition that would require excessive shimming, or modification of the structural surface, is to be reported for decision as to corrective measures.

### General.

The slabs of marble veneer are slotted in top and bottom edges to receive the leading edges of the I-S-R retention angles.

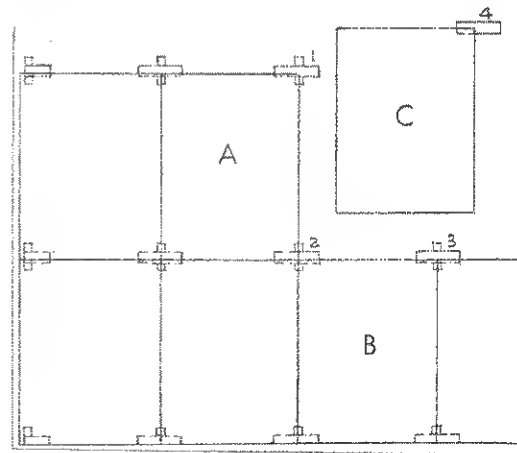
The retention angles are installed by bolting directly to anchorage fixtures previously built into the masonry wall, cast in the face of concrete columns and spandrel beams, or welded to framing steel.

Each retention angle, as it is installed, is shimmed out as necessary to bring the marble face to proper position and alignment in accordance with marble erection drawings. Each angle has compression tape preapplied to the marble-bearing surface.

Retention angles at the bottom of the starting course are installed to the level indicated on marble erection drawings. Angles installed at the top of each course for its retention will also provide support for the course next above, and are positioned at the proper level to establish the specified width of horizontal joint. A filler strip of foamed plastic, compressed in all joints as the marble slabs are installed, serves as a caulking stop and provides a secondary moisture barrier.

### Installation Procedure for a Typical Marble Veneer Slab.

1. Apply joint-filler strip to edges of pieces A and B where piece C will adjoin, and loosen the retention angle 1.
2. Lower piece C upon angles 2 and 3, and slide the slab toward piece A, gauging the width of vertical joint.



Loosely install retention angle 4 for the temporary restraint of piece C. The bed joint above piece B is gauged automatically by previous installation of retention angles 2 and 3.

3. Shim retention angle 1 for alignment of pieces A and C, position the angle to establish specified width of the horizontal joint between top of pieces A and C and the bottom of the next course, and tighten in place.
4. Repeat for the next piece.

#### Special Conditions.

Where large slab dimensions occur, anchorage fixtures should be provided for the installation of additional retention angles at top, bottom sides or back, as required.

Veneer slabs requiring side anchorage but having the vertical edge fully exposed may have retention provided as shown in detail on page 27.

Soffit slabs may be suspended by using retention angles in transverse joints and in longitudinal or transverse edges, as indicated on page 28.

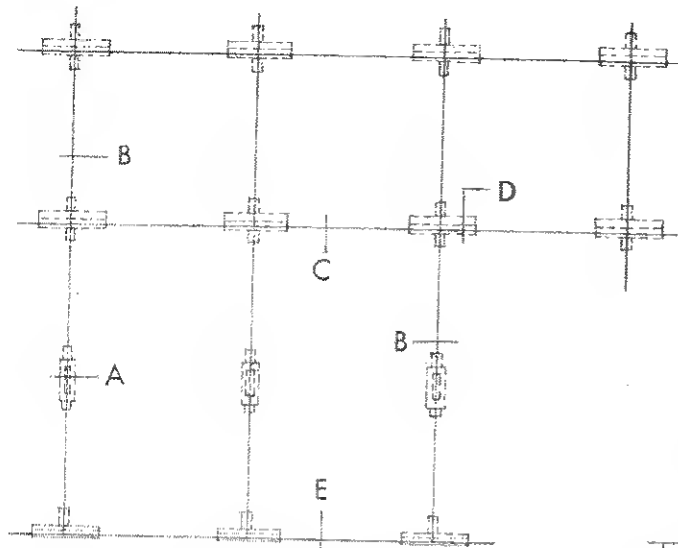
Lintels having the bottom edge completely exposed may be installed by one of the several methods illustrated on page 28.

At the top of a marble area, retention angles having the bolt-holes elongated are installed slightly above the marble with bolt snug but not tight and then forced down to engage the groove in the top edge of the marble. Details are on page 28.

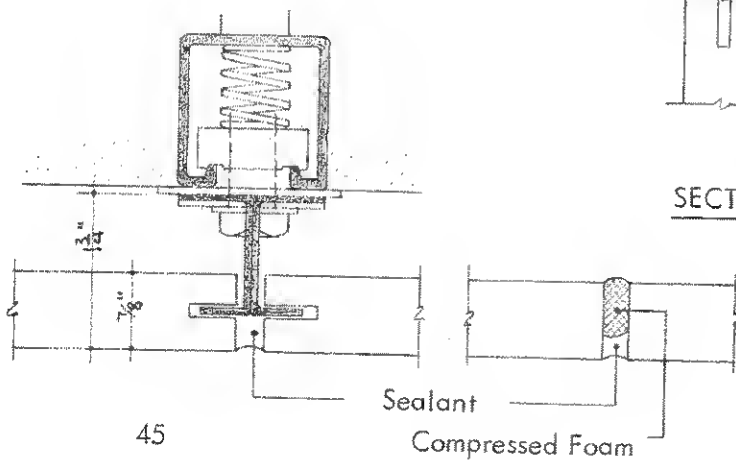
#### Final.

After the marble is installed all joints are sealed using an approved gun-type elastic sealant, following the manufacturer's instructions explicitly. Marble joints are masked with tape, and primed, when such procedures are required.

## INSTALLATION DETAILS FOR SURFACE MOUNTING



Key Elevation



45

Vertical Joints

PLAN at A

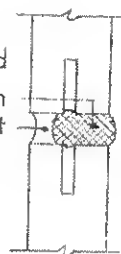
PLAN at B

### I-S-R Standards:

Full-length Angle	12" long
Half-length Angle	6" long
Side Anchor	6" high
Mounting Bolt	1/2" dia.
Joint Width	1/4"

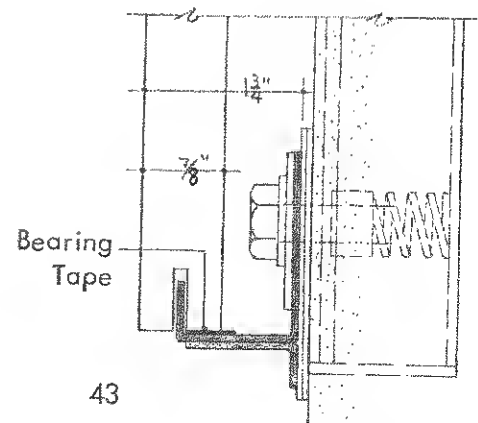
Compressed  
Foam  
Sealant

Shims  
Bearing  
Tape  
Sealant



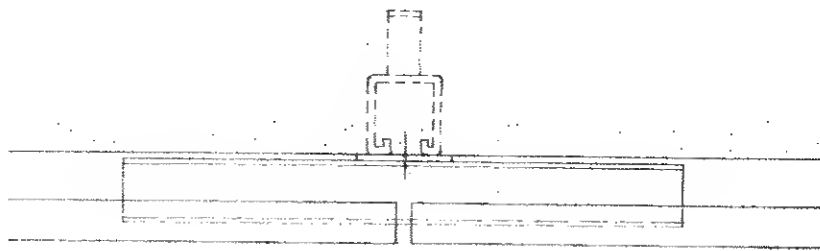
44

Horizontal Joints  
SECTION at C      SECTION at D

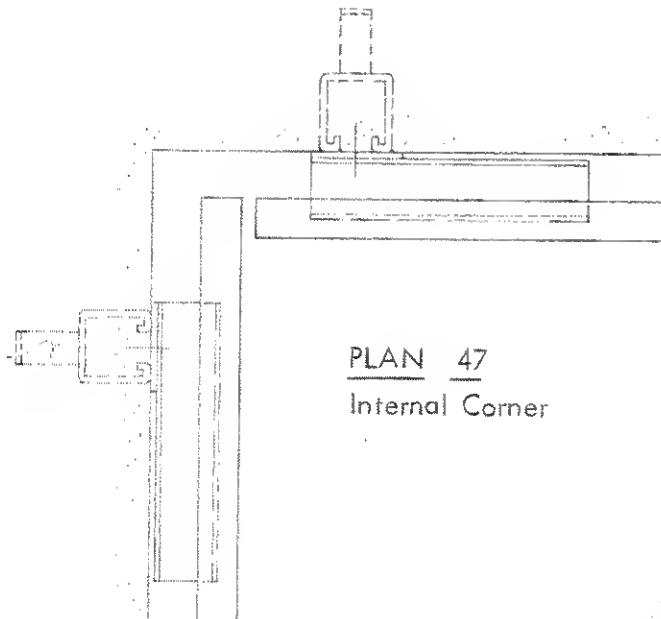


43

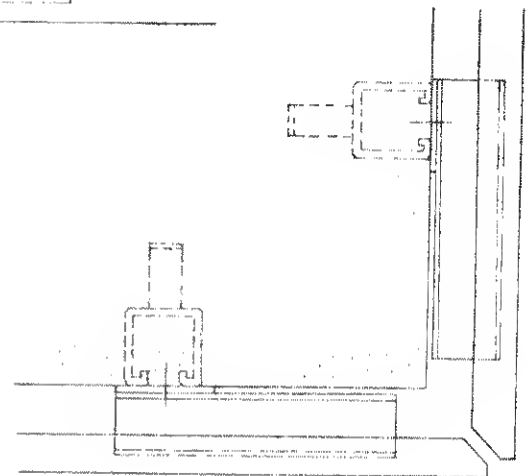
Bottom of Marble  
SECTION at E



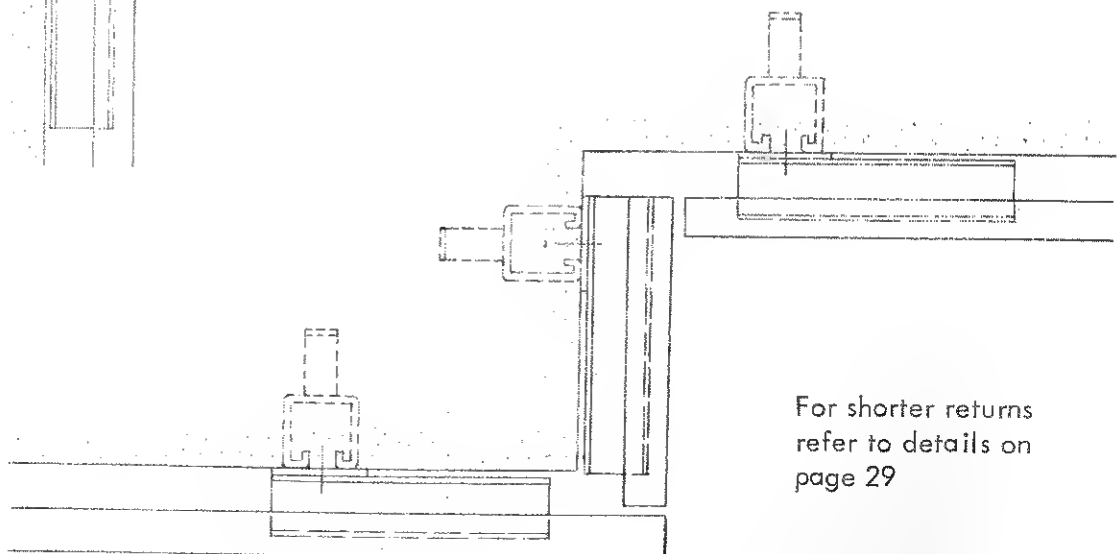
PLAN 46  
Plain Wall Area



PLAN 47  
Internal Corner

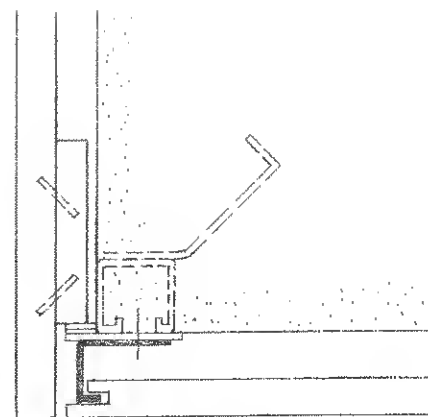
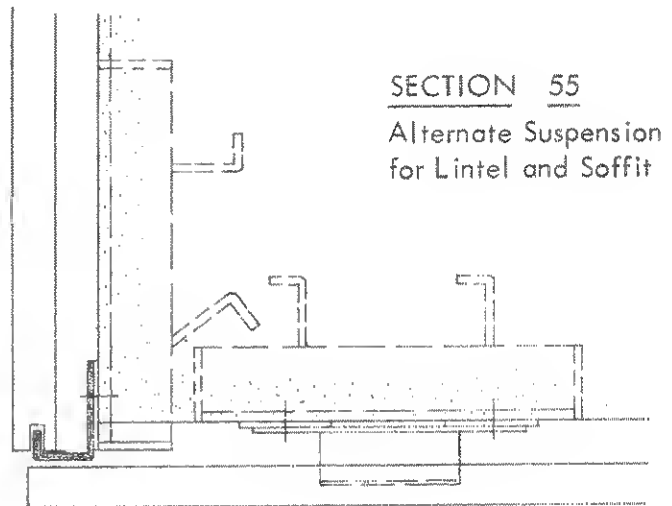
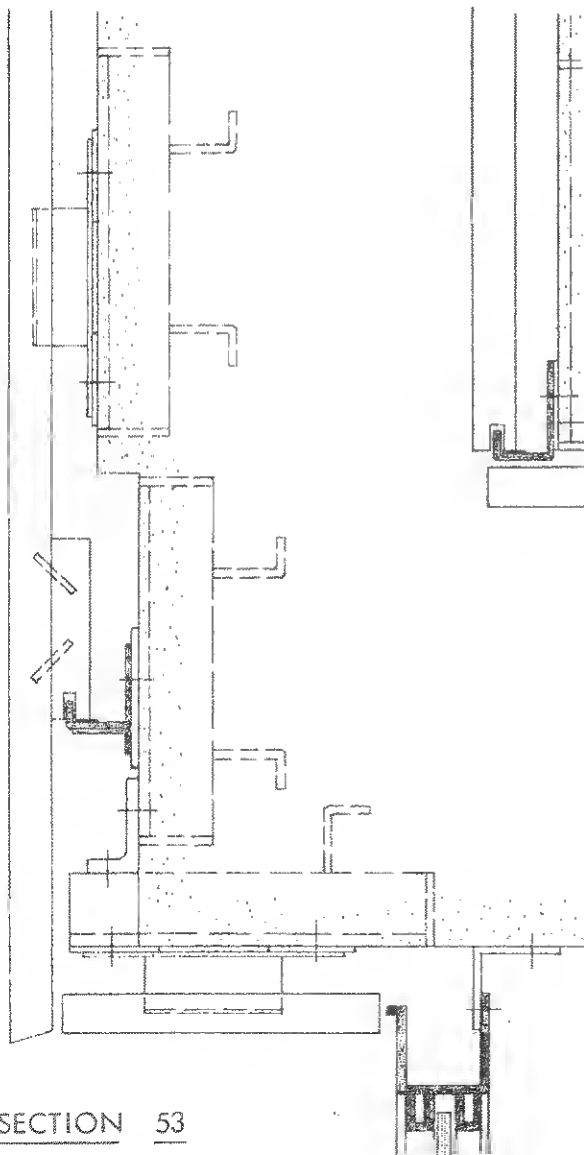
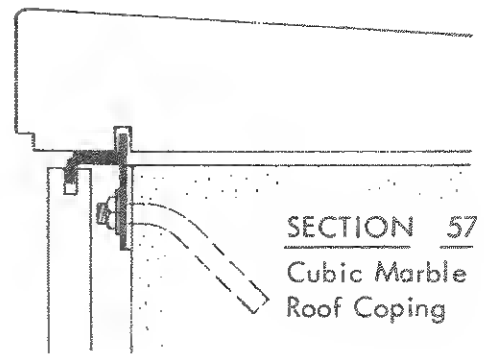
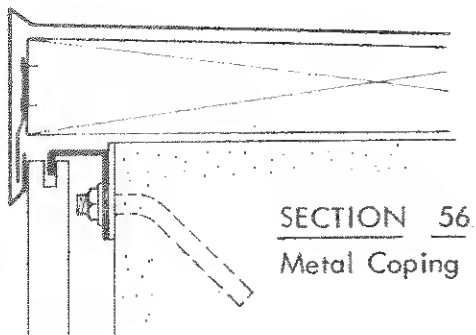


PLAN 48  
External Corner



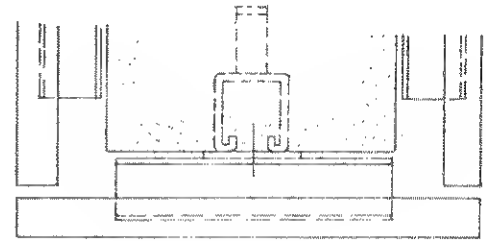
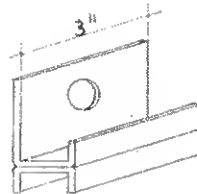
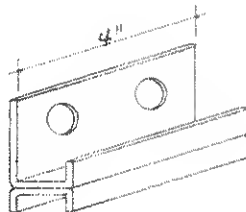
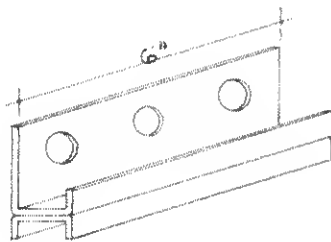
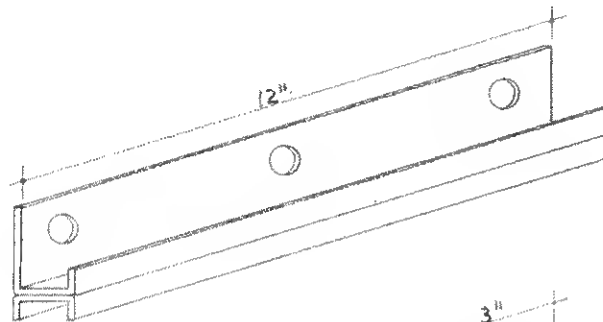
PLAN 49  
Pilaster Return

For shorter returns  
refer to details on  
page 29

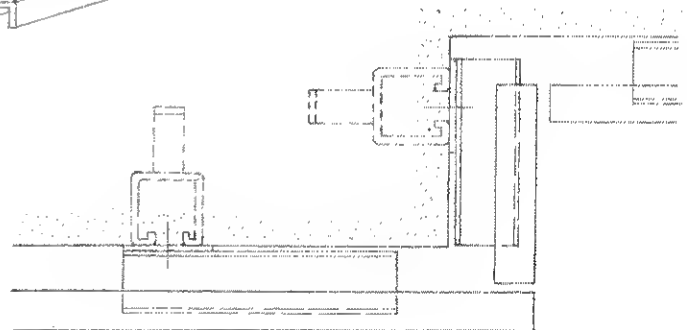


## RETENTION ANGLE MODIFICATION

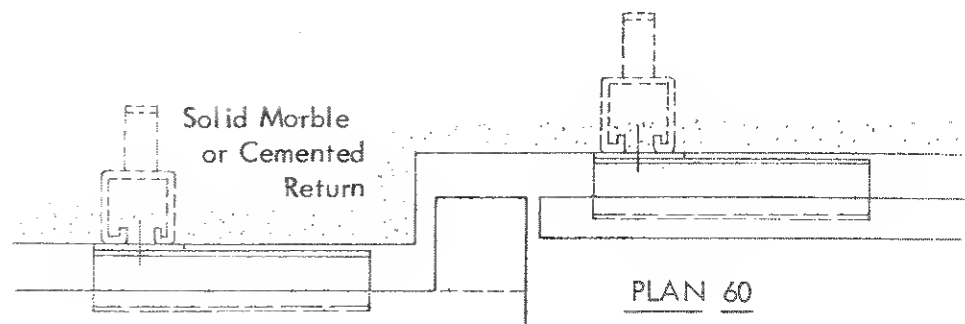
Simple modification of standard retention angles, involving cutting to reduced length, provides ready accommodation to space restrictions.



PLAN 58  
Narrow Pilaster  
or Projecting Wall



PLAN 59  
Short Pilaster Return or Wall Break with or  
without available space for anchorage fixture



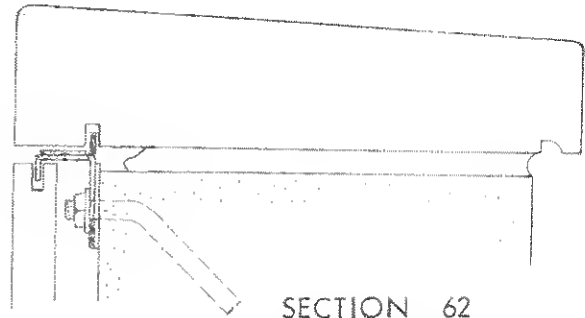
PLAN 60



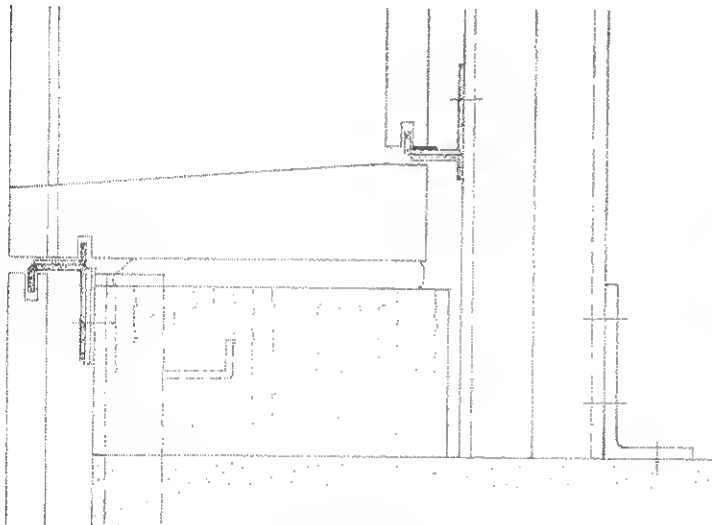
## ADAPTATIONS OF THE I-S-R METHOD

Where items of cubic marble are involved, I-S-R installation may be combined with conventional setting or employed with special support methods.

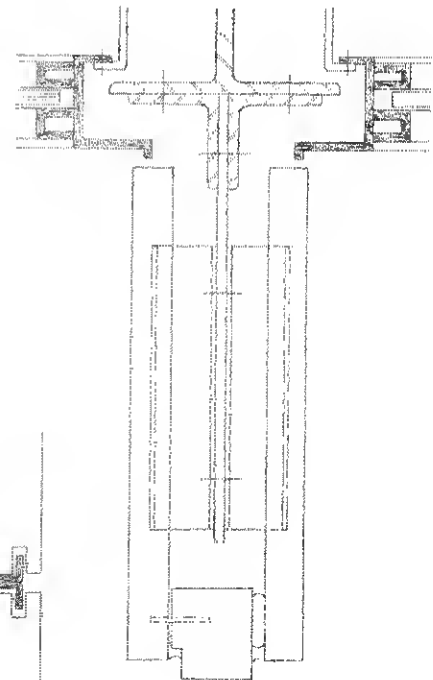
Installation of cubic marble employing the I-S-R method for alignment and retention, and conventional setting methods for support.



SECTION 62  
Cubic Marble  
Roof Coping

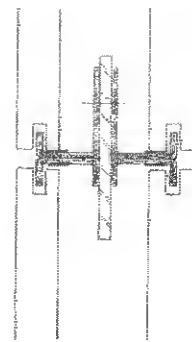


SECTION 61  
Cubic Sill at  
Recessed Wall



PLAN 63  
Marble Fin in  
Window Wall

Cubic marble installed by the I-S-R method using structural supports of special design.

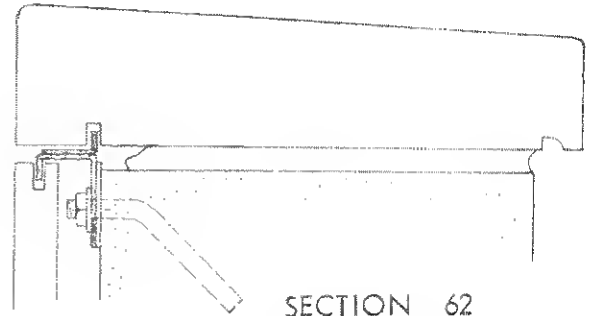


SECTION

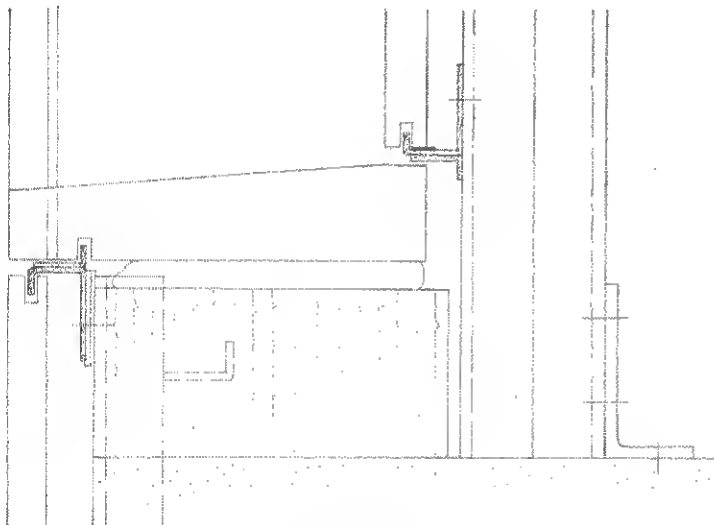
## ADAPTATIONS OF THE I-S-R METHOD

Where items of cubic marble are involved, I-S-R installation may be combined with conventional setting or employed with special support methods.

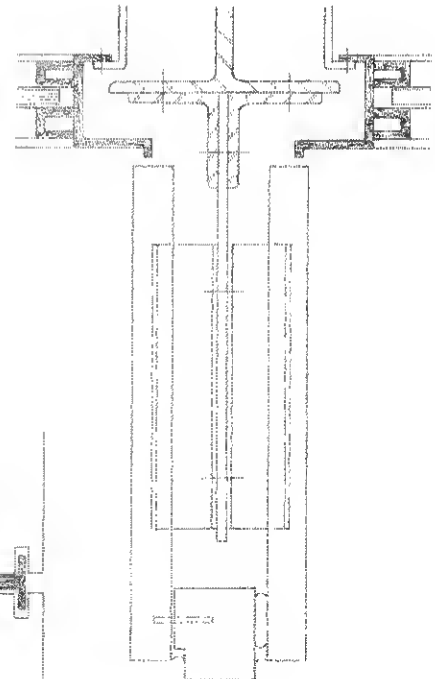
Installation of cubic marble employing the I-S-R method for alignment and retention, and conventional setting methods for support.



SECTION 62  
Cubic Marble  
Roof Coping

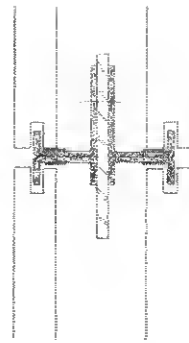


SECTION 61  
Cubic Sill at  
Recessed Wall



PLAN 63  
Marble Fin in  
Window Wall

Cubic marble installed by the I-S-R method using structural supports of special design.



SECTION

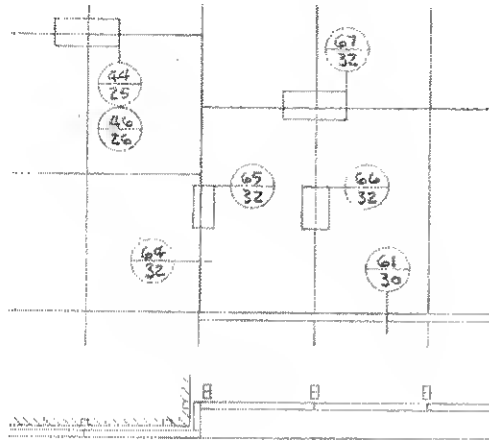
## GRID AND SURFACE MOUNTING

Schematic Elevations, Marble Veneer 31

Installation Details 32

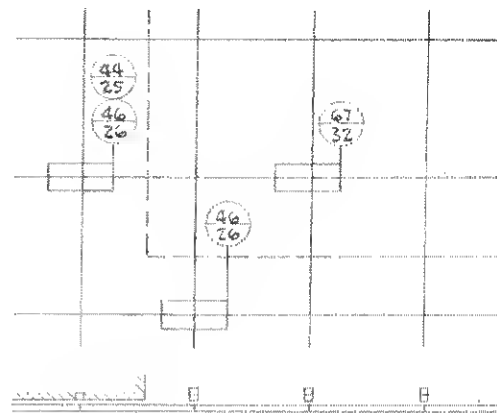
## GRID AND SURFACE MOUNTING

An important feature of the I-S-R method of marble veneer installation is its versatility, which often makes it possible to solve problems of architectural design with economy by using Grid Mounting and Surface Mounting in a combination system. Among many situations where combining the mounting methods could achieve a practical solution are the following: -



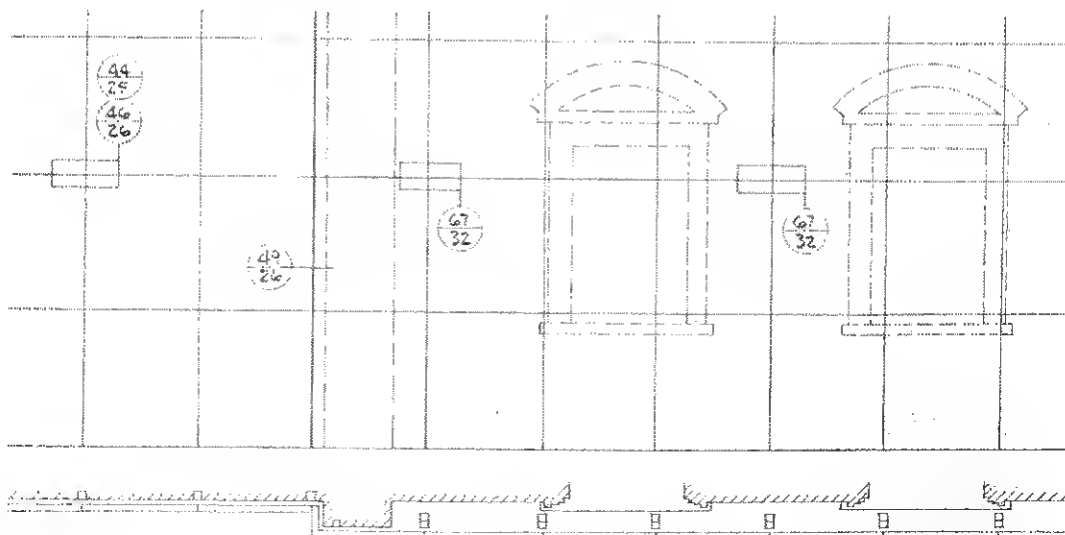
Recessed wall area with no masonry back-up wall.

Refer also to page 22.




Flat wall facing extended across an open space with no masonry filler-wall.

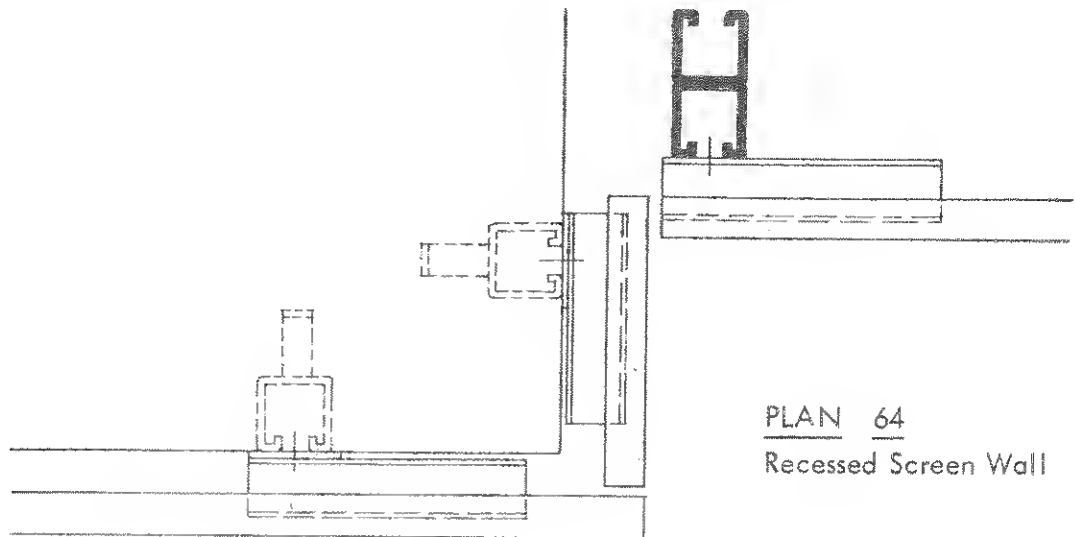
Refer also to page 20.



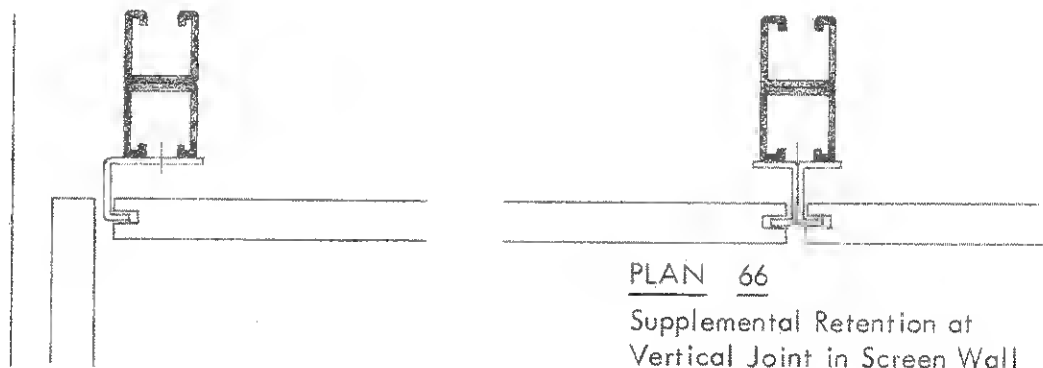
Projected wall area to cover architectural features of an existing building facade.

 Detail Number  
 Page Number

## INSTALLATION DETAILS

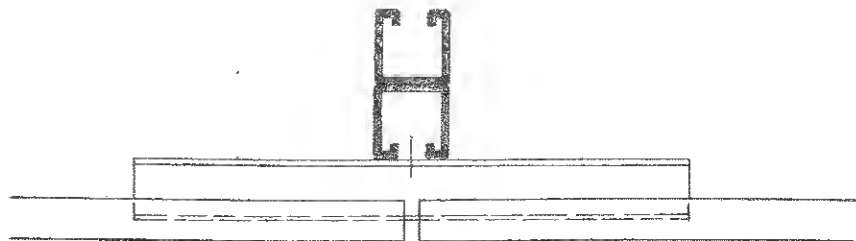


PLAN 64  
Recessed Screen Wall



PLAN 66  
Supplemental Retention at  
Vertical Joint in Screen Wall

PLAN 65  
Supplemental Retention at  
Vertical Edge in Screen Wall



PLAN 67  
Screen Wall Support and Retention

## DESIGN OF THE SYSTEM

Marble Thickness	33
Joint Width	33
Anchorage Pattern Determination	33
Mounting Grid Design	34
Distribution of Anchors	35

## DESIGN OF THE SYSTEM

The I-S-R system is applicable to both conventional and unusual architectural treatments. In some cases certain design factors require special attention.

### MARBLE THICKNESS

Details in this book show 7/8" marble with all fittings. However, these same standard fittings may be used with 1 - 1/4" marble when that thickness is selected.

Marble thicknesses greater than 1 - 1/4", for feature items or for a veneer area, may be accommodated by the use of auxiliary fittings (illustrated on page 19) or by the use of heavier gauge fittings. The supporting grid may require redesign in such cases.

Load calculations are based on 12.5 pounds per square foot for 7/8" marble and 18 pounds per square foot for 1 - 1/4" marble. Thicker veneer would be figured at 21 pounds per square foot for 1 - 1/2" marble, 28.5 pounds per square foot for 2" marble, and 170 pounds per cubic foot for thicker items.

### JOINT WIDTH

Joint width in the I-S-R system has been standardized at 1/4". This allows slightly more than 1/8" for thickness of metal plus compressed bearing tape, and the balance accommodates movement of the marble due to expansion, contraction or vibration.

Any change in width of joint would require special cutting in the marble or modification of the metal components and joint fillers, and would increase the cost.



### DETERMINATION OF ANCHORAGE PATTERN

The marble jointing pattern established by the Architect's design is the basis for locating and spacing the channel struts for Grid Mounting or the anchorage inserts for Surface Mounting.

In general, for Grid Mounting, vertical struts are placed behind each vertical joint in the marble veneer and a short distance back from any external or internal corner. Basic support and retention angles are located where horizontal marble joints intersect these strut lines.

Supplemental retention anchors in the vertical edges of tall marble slabs are mounted on these same struts. When the horizontal length of marble slabs makes additional support points desirable, an intermediate vertical strut is introduced or a horizontal channel may be bridged across between struts.

Anchors are located at the edges of all pieces of marble and larger slabs may have additional anchors at selected points in the back. The total number and distribution of fittings required for support and retention of the marble depends upon the width, height, and weight of the individual slabs.

In the guidance chart on page 35, solid rectangles  indicate the basic support and retention angles and open squares  indicate the number and location of recommended supplemental retention fittings.

For Surface Mounting, the anchorage inserts normally are located in the same places where fittings would occur with the Grid Mounting system.

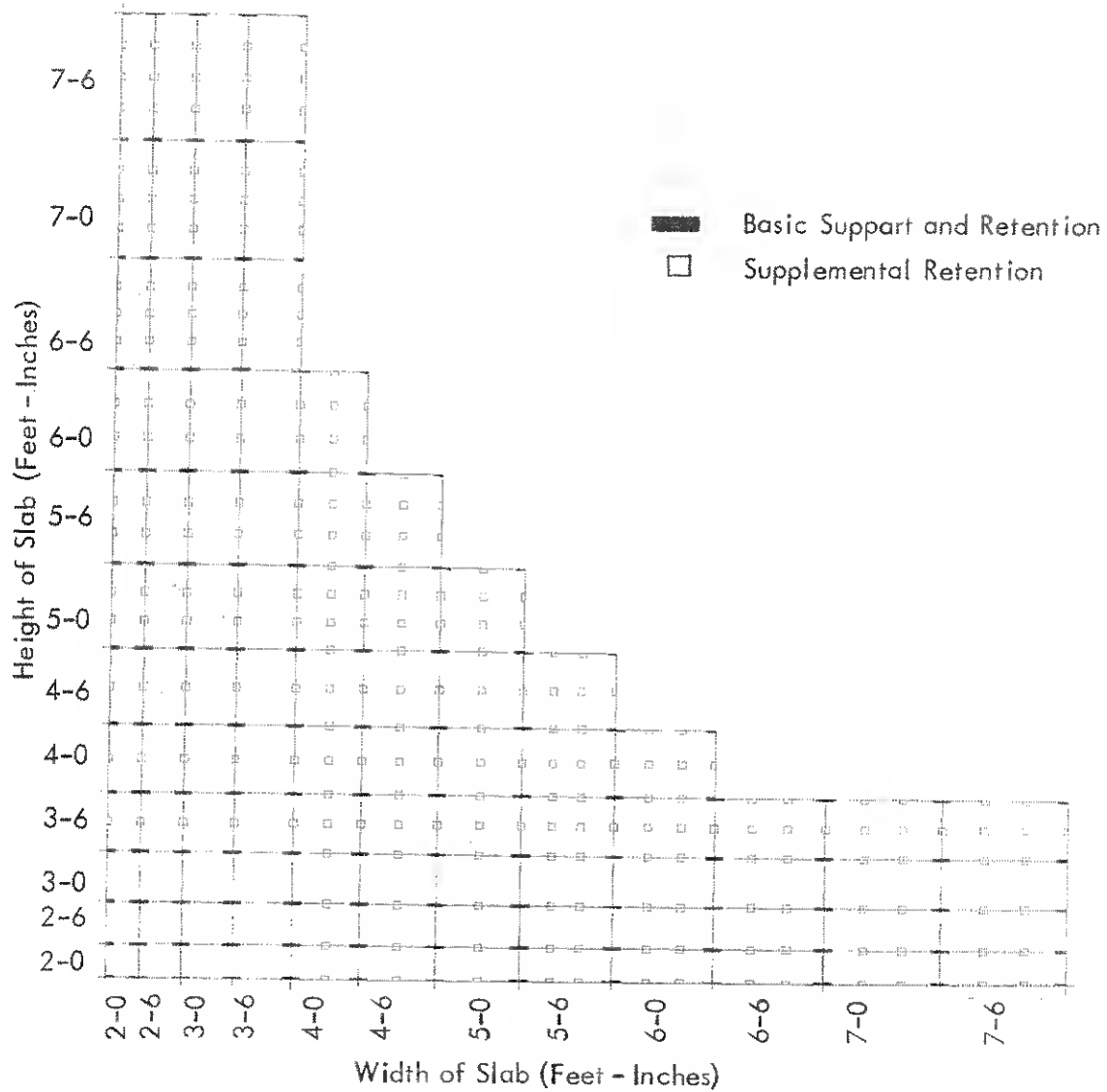
#### ATTACHMENT OF MOUNTING GRID

Where the vertical struts are mounted against a continuous structural surface, standard single channels would be used with attachments to the structure spaced not over five feet apart. In situations where such frequency of attachment is not passible, as in the case of struts spanning an open space between floor slabs or spandrel beams, the double channel would be used or a single channel of extra depth may be employed.

When the grid design requires that a channel carrying load-bearing retention angles be placed horizontally between vertical struts, the torsional stress in the channel should be relieved by locating attachments to the structure at points closely adjacent to the retention angle.



## DISTRIBUTION OF ANCHORS



Recommended Distribution of Basic and Supplemental  
 Support and Retention Angles, for 7/8" and 1 - 1/4"  
 Marble Veneer.

## COMPONENT DETAILS

Support and Retention Angles	36
Grid Components	41
Anchorage Units	44
Assembly Hardware	45
Sealing Materials	47

## SUPPORT AND RETENTION ANGLES

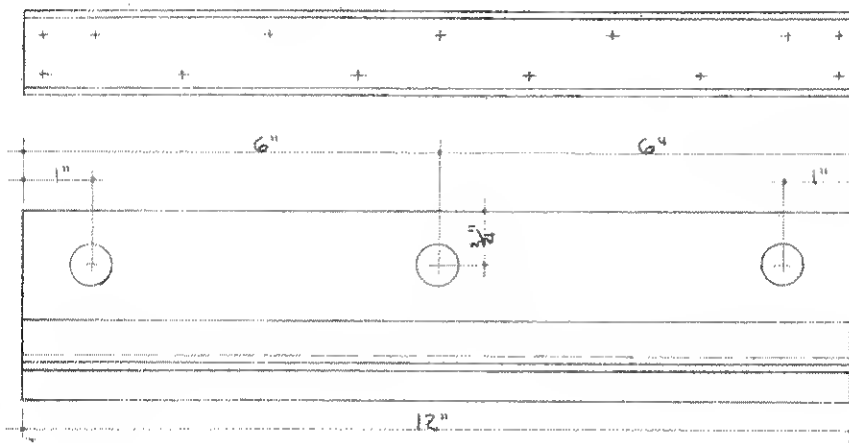
### SPECIFICATION

Material : Stainless Steel  
 Brushed Finish  
 Thickness: 14 Gauge .075"

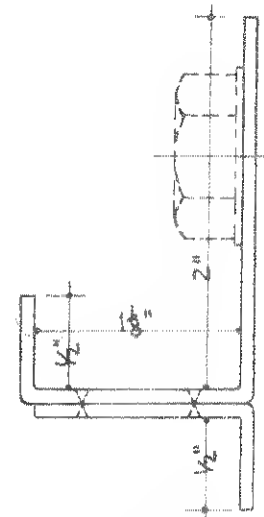
### STARTING TYPE

Series 100

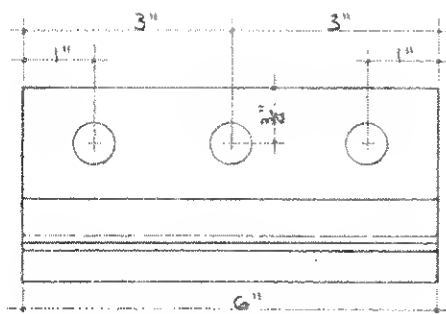
Holes 9/16" Diameter



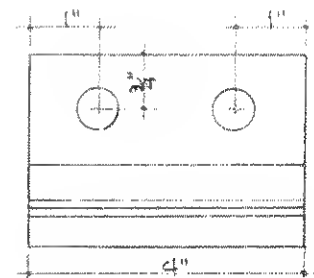
V100-12



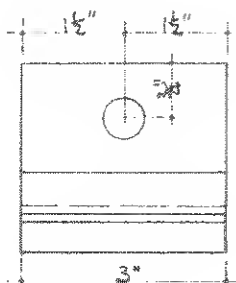
SECTION  
FULL SIZE



V100-6



V100-4



V100-3

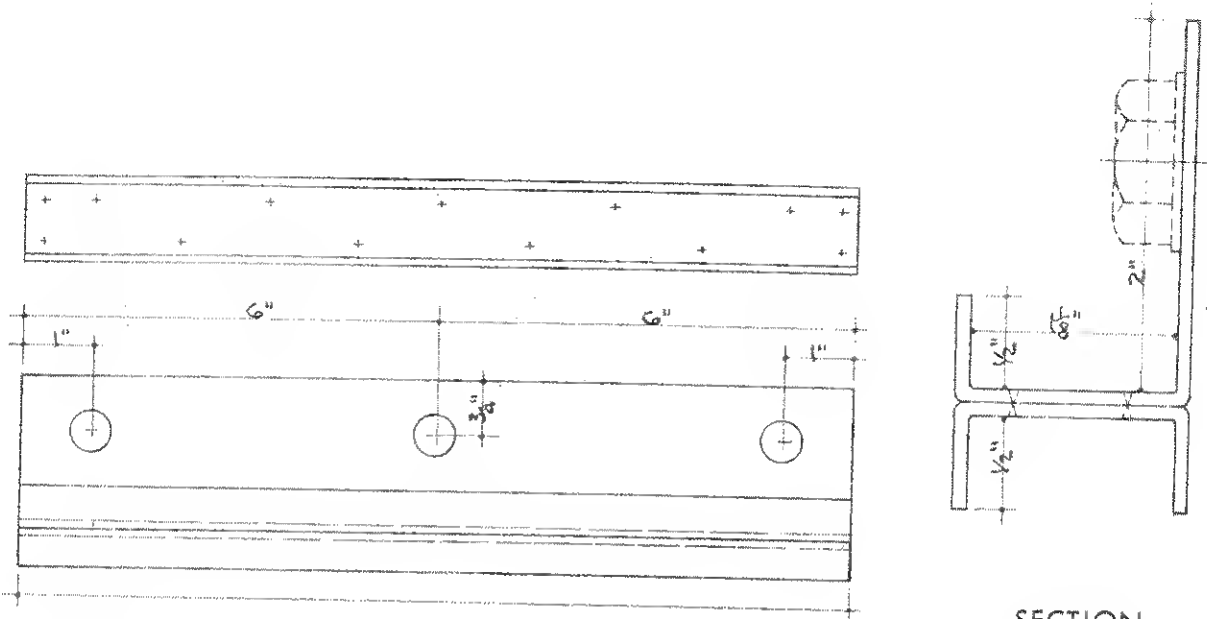
### WEIGHTS

V100-12	1.37 lbs.
V100-6	0.685 lbs.
V100-4	0.457 lbs.
V100-3	0.343 lbs.

# INTERMEDIATE TYPE

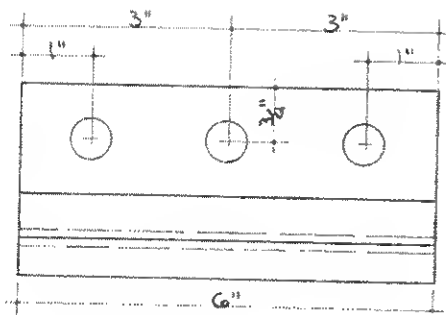
Series 110

Holes  $9/16"$  Diameter

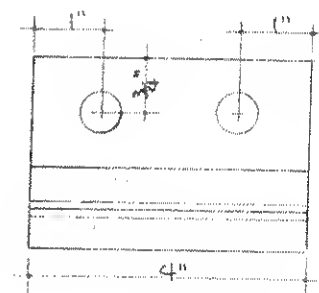


V110-12

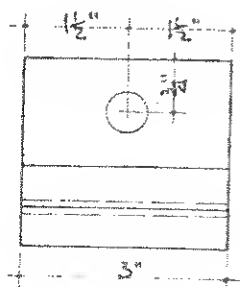
SECTION  
FULL SIZE



V110-6



V110-4



V110-3

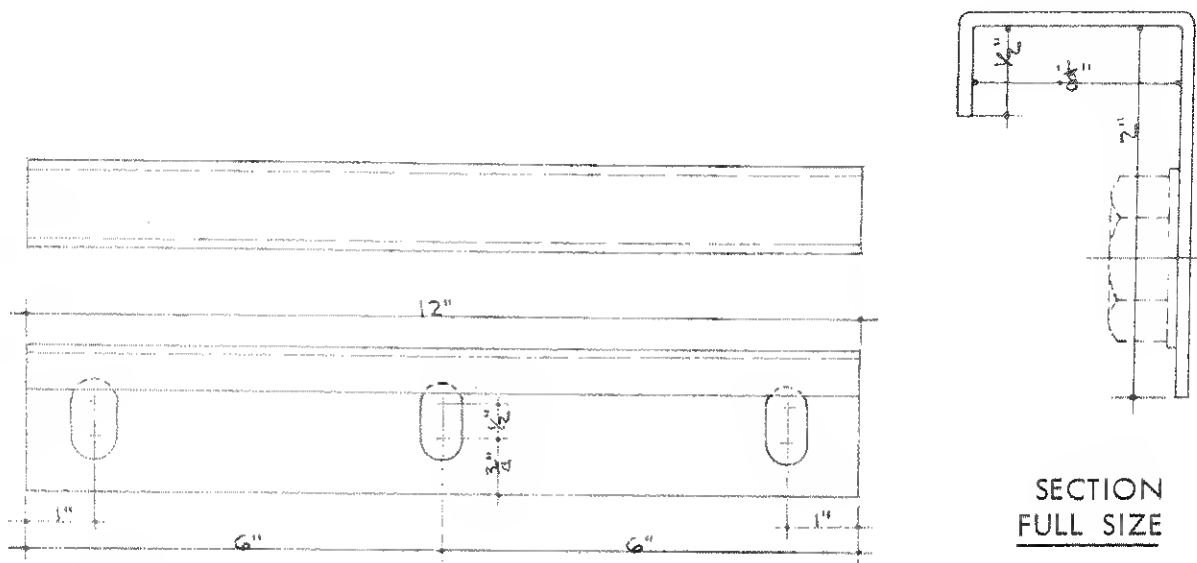
## WEIGHTS

V110-12	1.5	lbs.
V110-6	0.75	lbs.
V110-4	0.5	lbs.
V110-3	0.375	lbs.

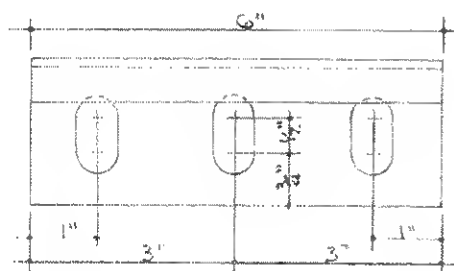
# TOP RETENTION TYPE

Series 120

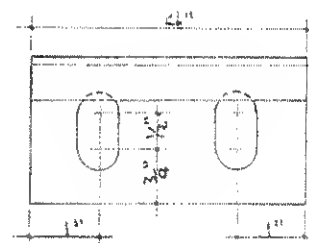
Holes  $9/16"$  x  $1-1/16"$



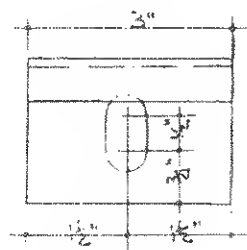
V120-12



V120-6



V120-4



V120-3

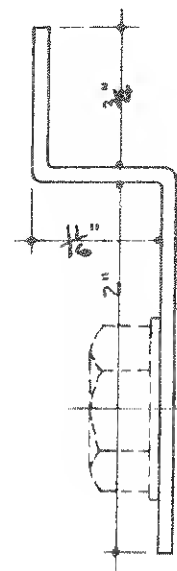
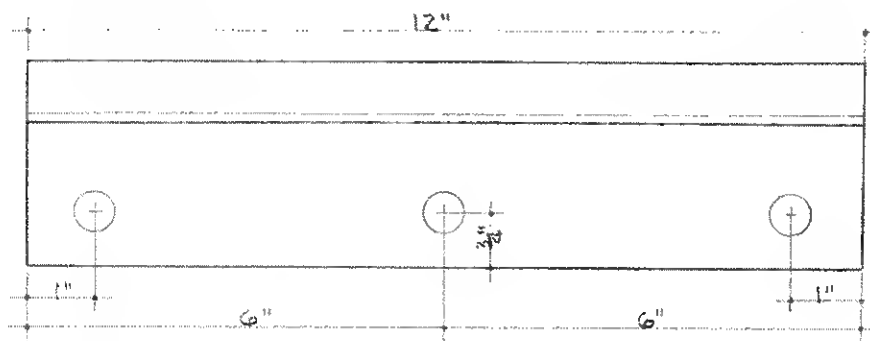
## WEIGHTS

V120-12	0.946 lbs.
V120-6	0.473 lbs.
V120-4	0.315 lbs.
V120-3	0.237 lbs.

# BACK RETENTION TYPE

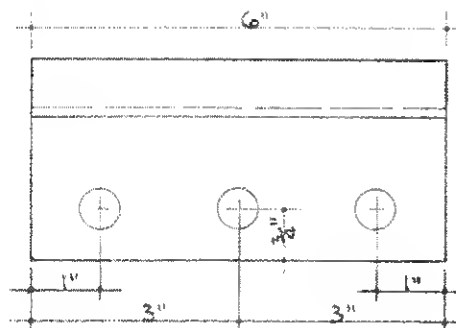
Series 130

Holes 9/16" Diameter

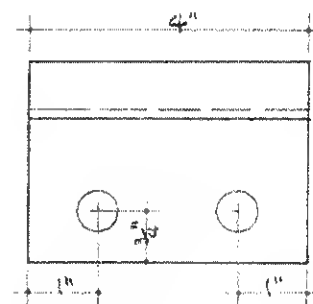


SECTION  
FULL SIZE

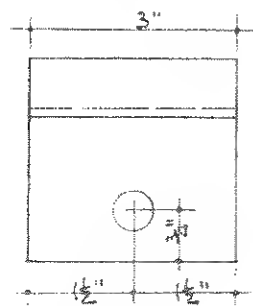
V130-12



V130-6



V130-4



V130-3

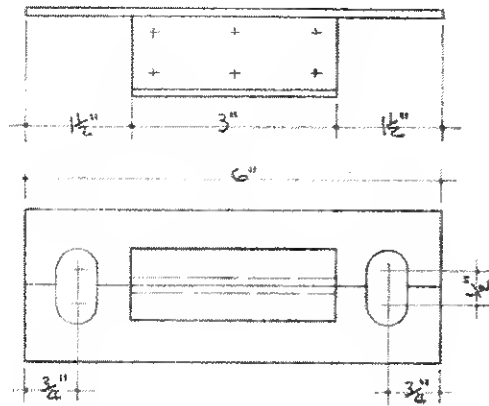
## WEIGHTS

V130-12	0.920 lbs.
V130-6	0.460 lbs.
V130-4	0.310 lbs.
V130-3	0.230 lbs.

EDGE RETENTION TYPE

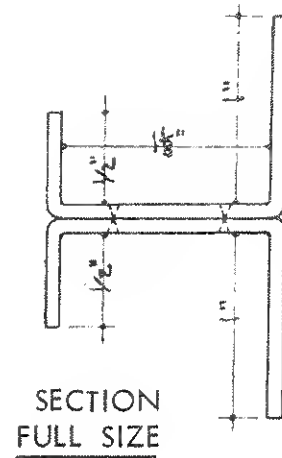
Series 140

Holes  $9/16"$   $\times$   $1-1/16"$



V140

Weight .412 lbs.



## GRID COMPONENTS

### GRID STRUTS

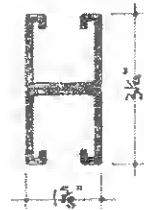
Material: Steel, enameled or galvanized finish  
Thickness: 12 Gauge .109"  
Stock Lengths: 10 and 20 Feet



V200

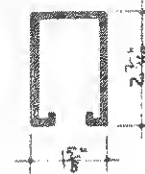
Wt. 2 lbs.  
per foot

Available also with holes  
in back for direct bolting  
to wall.



V201

Wt. 4 lbs.  
per foot

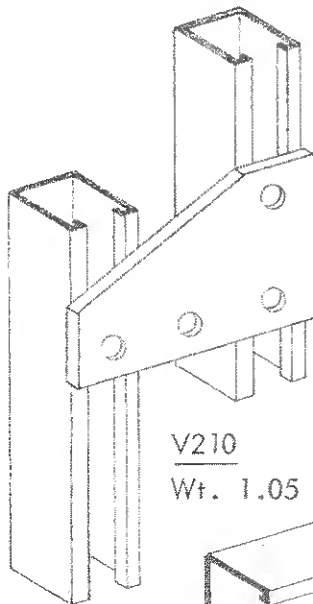


V202

Wt. 2.60 lbs.  
per foot

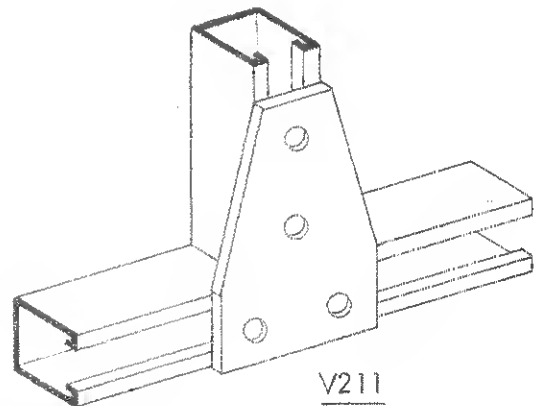
### GRID FITTINGS

Material: Steel, enameled  
Thickness: 1/4"  
All Holes: 9/16" Diameter  
All Slots: 9/16" x 1-1/16"



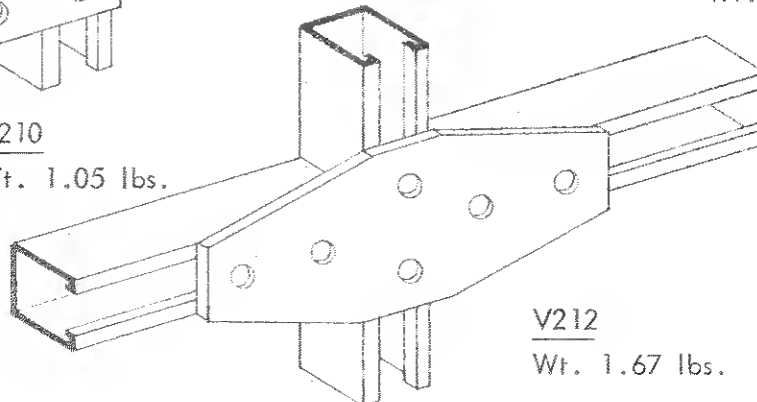
V210

Wt. 1.05 lbs.



V211

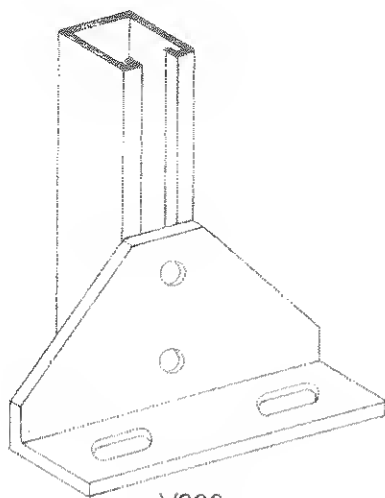
Wt. 1.05 lbs.



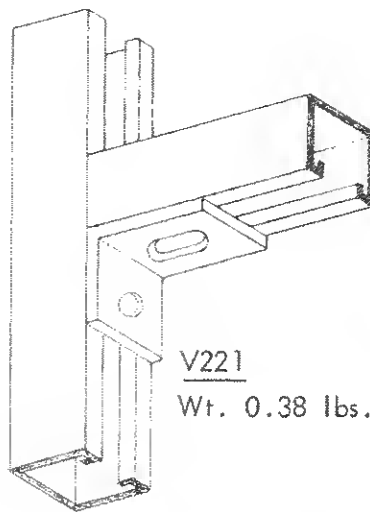
V212

Wt. 1.67 lbs.

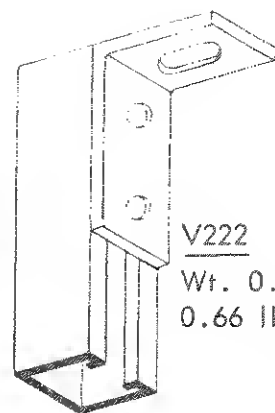




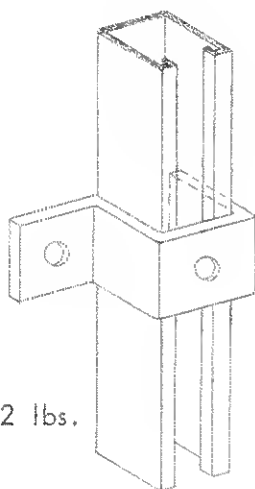
V220  
Wt. 1.90 lbs.



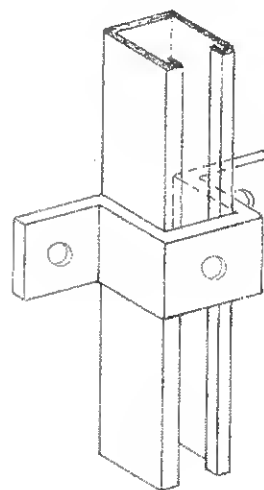
V221  
Wt. 0.38 lbs.



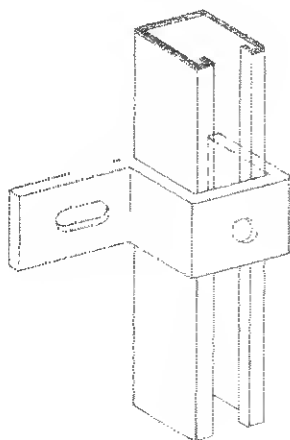
V222  
Wt. 0.66  
0.66 lbs.



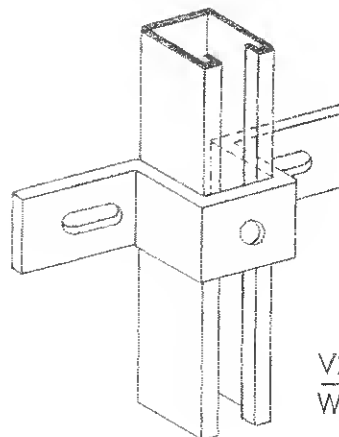
V230  
Wt. 0.72 lbs.



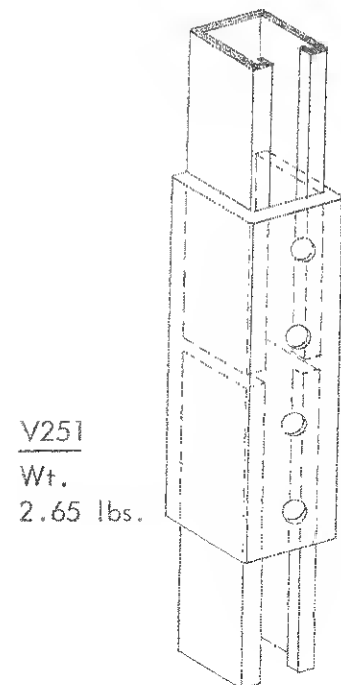
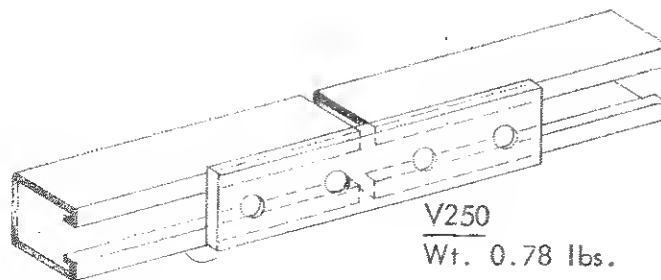
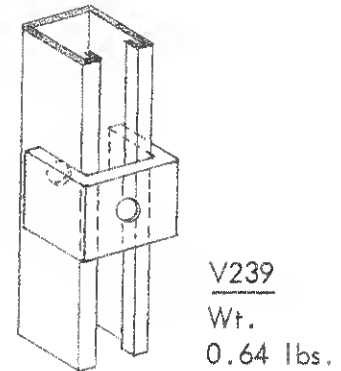
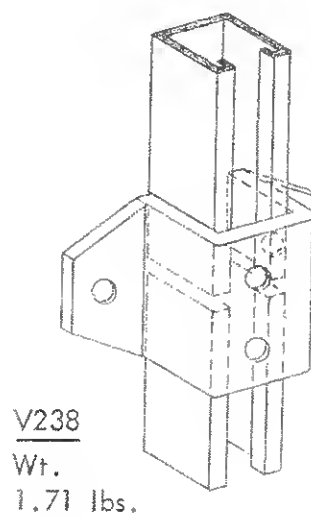
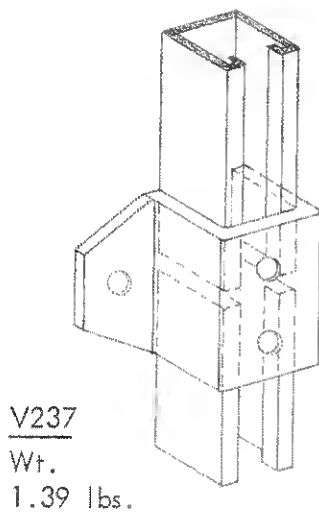
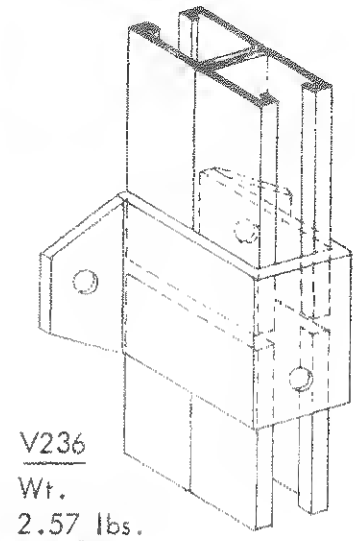
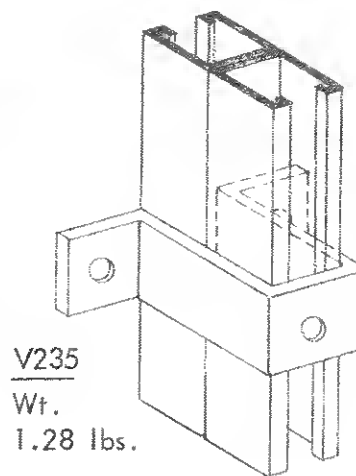
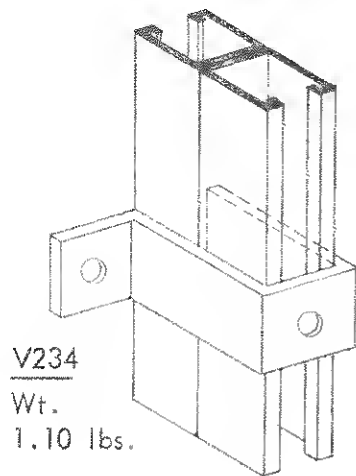
V231  
Wt. 0.88 lbs.



V232  
Wt. 0.80 lbs.



V233  
Wt. 1.05 lbs.

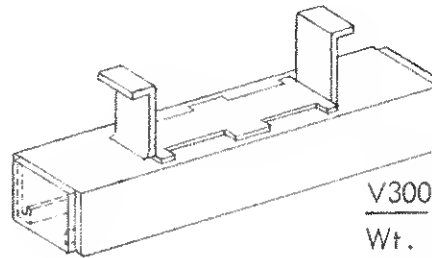


## ANCHORAGE UNITS

### CHANNEL INSERTS

Material: Steel, galvanized  
Thickness: 12 Gauge .109"  
Standard Length: 8"; Also available in continuous strips

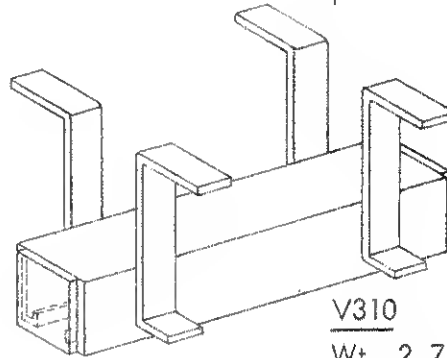
For casting in concrete:



V300

Wt. 2.27 lbs.  
per foot

For building into masonry:



V310

Wt. 2.75 lbs.  
per foot

### DEFORMED BOLT

Material: Stainless steel  
Diameter: 1/2"  
Length and deformation to suit conditions

For casting in concrete:

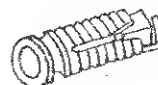


V320

### EXPANSION SLEEVE

Material: Malleable iron  
Diameter: 7/8"  
Length: 2 - 1/4"

For insertion in prelocated  
holes, in concrete or masonry:



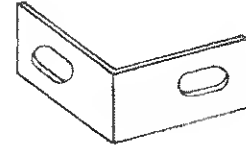
V330

## ASSEMBLY HARDWARE

### ANGLE CONNECTOR

Material: Stainless Steel  
Thickness: 14 Gauge .075"  
Width: 1 - 1/2"  
Holes: 9/16" x 1 - 1/16"

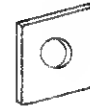
V400



### PLATE WASHER

Material: Stainless Steel  
Thickness: 14 Gauge .075"  
Dimensions: 1 - 3/4" x 1 - 3/4"  
Hole: 9/16" Diameter

V405

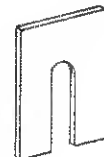


### SHIMS

Material: Steel, galvanized  
Dimensions:

2" x 2"

2" x 3"



Thickness 1/16"

V410

V412

Thickness 1/8"

V411

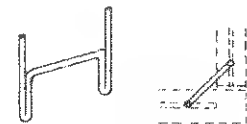
V413

### MARBLE CONNECTOR

Material: Stainless Steel  
Wire: 1/8" Diameter



V415



V416

## BOLTS

Material:	Cap Screws and Nuts:	Steel, electro-galvanized
	Toothed Lockwashers:	Stainless Steel
	Expansion Sleeves:	Malleable Iron
Diameter:	1/2"	

Individual Parts:

V421

V422

V423

Bolt Assembly

V420



Individual Parts:

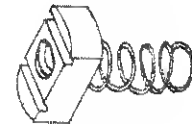
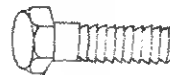
V421

V422

V424

Bolt Assembly

V430



Individual Parts:

V425

V422

V330

Bolt Assembly

V440



## SEALING MATERIALS

### TAPES

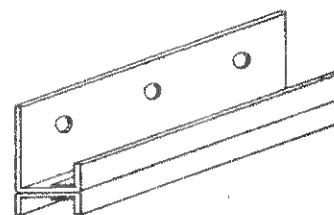
#### Specification

Non-staining resin-based closed-cell resilient foam tape, with pressure-sensitive adhesive on one side.

#### Bearing Tape

1/32" x 1/2". For use on marble-contact surfaces of retention angles.

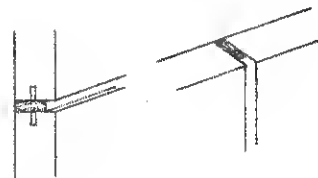
V500



#### Filler Strip

5/16" x 3/4". For use in marble joints where no retention angle occurs.

V510



### SEALANT

#### Specification

Non-staining waterproof elastic compound, compatible with adjacent materials and bonding permanently to joint surfaces.

#### Sealant Cartridge

For gun application in all marble joints.

V520



Standard 1/4" joint, 1/4" deep, requires .004 gallons per foot.

SPECIFICATION

Marble Veneer Installation

48

## SPECIFICATION

### MARBLE VENEER INSTALLATION

All marble veneer shall be attached to the building structure, to the lines, levels, planes and dimensions shown on the contract drawings, by the Vermarco I-S-R method. All materials and workmanship shall be in strict accordance with the requirements and recommendations of that system.

Anchorage fixtures in the structure for direct attachment of the I-S-R retention angles, or for attachment of the grid on which the I-S-R retention angles will be mounted, shall be in the locations and positions shown on drawings provided by the marble subcontractor but shall be supplied and installed under other sections of the specifications.

All necessary components of the I-S-R System, including all components of the mounting grid where such structure is indicated or required on the contract drawings, shall be furnished and installed by the marble subcontractor in accordance with approved marble erection drawings. Any damage to protective coatings on members of the mounting grid or on the structure shall be repaired satisfactorily before marble installation is allowed to proceed.

Bearing tape, compressible filler strips, and elastic sealant in marble joints, shall be as recommended for use in the I-S-R System and shall meet with the approval of the Architect.

I-S-R retention angles shall be mounted where shown on approved marble erection drawings, at proper levels and in true alignment, without distortion. Marble slabs shall be erected concurrently with the retention angles and joint filler strips, all in accordance with I-S-R installation procedure.

Joint sealant shall be applied by the marble subcontractor and in accordance with manufacturer's instructions.



## BIBLIOGRAPHY

## Bibliography

EXTERIOR VENEER STANDARDS

by Vermont Marble Company

MARBLE-FACED PRECAST BUILDING PANELS

by Vermont Marble Company

MARBLE DESIGN MANUAL I

by Marble Institute of America

SALES - SERVICE OFFICES

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